

# FLIGHT

The  
AIRCRAFT ENGINEER  
AND AIRSHIPS

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Founder and Editor: STANLEY SPOONER

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## DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1930

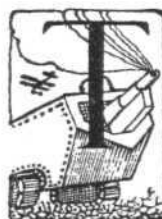
- Mar. 7 .... R.A.F. Boxing Championship at Uxbridge.
- Mar. 8 .... Inter-Services Rugby. R.A.F. v. Coventry, at Coventry.
- Mar. 8 .... Hockey. Cranwell v. Sandhurst at Sandhurst.
- Mar. 10 .... "Air Transport." Lecture by Herr M. Wronsky before R.Ae.S.
- Mar. 12 .... Rugby Match. R.A.F. v. Civil Service, at Halton.
- Mar. 12 .... Royal Air Force Club Annual General Meeting.
- Mar. 15 .... Association Football. R.A.F. v. Army, at Homerton.
- Mar. 22 .... Inter-Services Rugby. R.A.F. v. Army at Twickenham.
- Mar. 26 .... Royal Aero Club House Dinner, and Annual General Meeting.
- Mar. 27 .... British Gliding Association Inaugural Meeting.
- April 3 .... "Operation of the Aero-Postale Service in Europe." Lecture by M. P. Grimault before R.Ae.S.
- April 19 .... Leicester Flying Meeting.
- June 28 .... Royal Air Force Display, Hendon.
- July 5 .... King's Cup Race.
- July 20- Aug. 7 .... International Light 'Plane Tour of Europe, starting from Berlin.

## INDEX FOR VOL. XXI

The Index for Vol. XXI of "Flight" (January to December, 1929) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C.2. Price 1s. per copy (1s. 1d. post free).

Copies of this Index were included free to all Annual Subscribers in "Flight" issue of February 14, 1930.

## EDITORIAL COMMENT



THE Federation of British Industries recently received a report from a correspondent in Buenos Ayres which strongly criticized the apparent indifference in Great Britain to the enormous possibilities of air transport in South America. In the Argentine, the air services are in the hands of a French, a German, and a United States company. The absence of British activities, according to this correspondent, is a matter of surprise to the press and the public in the Argentine. Apart from participation in the air services, there is, in South America, a good market for aeroplanes and accessories of which the British trade does not appear to be taking anything like full advantage.

### The South American Market

The remarks of this correspondent appear to be very timely. The British Empire and South America would seem to be the two best markets in the world for British aircraft. Of the two, South America is probably the more likely to produce immediate big orders. This does not mean that the Dominion markets should be neglected while effort was concentrated upon the republics of South America. The Buenos Ayres writer seemed inclined to be indignant that British flying interests were thinking of the British Empire first. To let foreign constructors capture the Dominion markets at the present critical time, when the tide of air-mindedness is on the flow, would be a mistake which would surely

cause bitter regrets in days to come. The case of Canada naturally leaps to the mind, for there foreign aircraft seem to be rapidly establishing themselves at a time when flying is spreading in all directions. Even so, we understand that those British firms which have formed branch Canadian companies have had no cause to regret the step. Canadians are only too pleased to recognise the superior quality of British aeroplanes, and when these craft are readily available they hold their own with ease. In South Africa it is sad to see the one air transport company turning to foreign designs. In Australia the foreigner has not yet made progress, for Australian sentiment grants a decisive preference to British aircraft imports. Nevertheless, foreigners are prepared to fight for that market, and British firms will need to keep wide awake if they are to retain their supremacy.

But while it is only common sense to use every effort to win all these British markets, that is no reason why the other great market of the world should be neglected. Of course, we are aware of the signal success of several British firms in securing handsome orders for military and civil aircraft from not a few of the South American republics. Such orders are not to be despised. At the same time it is a tenable view that commercial air transport has a larger future than can be provided by fighting services. We will not lay too much stress upon the popular talk of disarmament, but there is certainly a world-wide tendency to restrict armaments. In any case, we must inevitably believe in a future in which civil aircraft will outnumber service aircraft as much as the world's mercantile marine outnumbers the world's navies. This, perhaps is taking the long view. To take action on the long view may entail some foregoing of present profits for the sake of future big business. But FLIGHT has always believed in taking the long view, and its own first appearance 21 years ago was an action in accordance with that belief. If it urges British aircraft firms in general to stake the present on the future, it can at least claim to have practised what it preaches.

British flying interests have not ignored South America in the past. We may recall the air survey in Venezuela by the Bermuda and West Atlantic company in 1920, and the gallant effort of Major Shirley Kingsley to run an air service between Buenos Ayres and Monte Video. Perhaps these and other efforts were before their time, but it is not the usual British way to be discouraged if a plucky but premature attempt is not a complete success. The opportunities for running air services and selling aircraft in many parts of South America still remain. The conditions in huge tracts of the continent resemble

the conditions which made such a splendid opportunity for air lines in Australia. These include a sunny climate, open plains (Pampas), great distances between centres, and paucity of good roads and railways. To this list may be added the wealth of a number of the merchants and *estancieros* or ranchers. These men are able and willing to pay for quick transport whether they are bent on business or on pleasure. The younger generation should take readily to piloting private light aeroplanes. These conditions together make an ideal opportunity for aircraft to display its value to mankind.

Naturally, there are other parts of the continent where nature makes travel of all sorts difficult. The crossing of the Andes must always be an undertaking. Aeroplanes have flown across the range, but the risk is always great. However, in Colombia the combination of mountains and river has created a special call for aircraft. The Germans were quick to seize this opportunity, and by flying seaplanes up the Magdalena river they have shortened the time of transit between the port of Barranquilla and the capital, Bogota, by some fantastic amount of time. It is gratifying to know that, for a branch service through the mountains, the company is using "Moths."

There is one more consideration to be borne in mind. It is sentimental, but may none the less conduce to business. The Latin Americans, in general, have a very friendly feeling for the British, and this feeling is particularly strong in the Argentine. There is no foreign people with whom the Latin Americans would sooner do business than with the British. This sentiment is scarcely likely to be translated into action unless the British products are brought prominently before their notice, and it is made easy for them to purchase the goods. If the Society of British Aircraft Constructors could arrange for a joint British mission to visit South America and give displays of flying by a carefully selected number of types considered specially suitable to the local conditions, both service and civil types, we have little doubt that the result would soon justify the outlay. Of course, it is not likely that every member of the association could send over a machine which, at the moment, would be just what South America needs. Again, we would urge the long view. So long as orders came to Great Britain, the whole British industry would benefit. Some firms might have to wait longer than others for their results, but every British firm would gain in credit by the success of one, and all would find that they had a special *entrée* into South America when the time came for them to press their special types in that proverbial El Dorado.



#### Royal Aeronautical Society Lectures.

ON Monday, March 10, Herr Martin Wronsky is visiting this country to give a lecture before a joint meeting of the R.Ae.S. and the Institute of Transport on "Air Transport." Herr Wronsky is one of the leading authorities in Germany on air transport, and it is largely due to his energies, initiative and organising genius that the German air lines are forming a network over Europe. The lecture, which will be illustrated, will be delivered in the Lecture Hall of the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, at 5.30 p.m. Will members please note the change of hour and place from the usual.

On March 14, Professor Fridtjof Nansen, the world-famous Polar explorer, is coming to England to lecture before the R.Ae.S. and the Royal Meteorological Society on "The Aims and Objects of the Aeroarctic." There is no greater authority

than Professor Nansen on the possibilities of the Polar Regions forming one of the most important air routes of the future, and his lecture will be one of outstanding interest and importance. It will be very fully illustrated and will be delivered in the Lecture Hall of the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, at 6.30 p.m.

#### Presentation to R 101

THE Mayor of Bedford, Alderman Morling, presented a gift of silver plate subscribed for by the citizens of Bedford to the airship R 101 on February 26. Flight-Lieut. H. C. Irwin, the captain of the ship, accepted the gift. He said that in R 101 they had a good airship, and by the time she had finished her test flights she would be a better ship. They felt sure of success, and believed that Bedford would become of international importance as an air port, as well as being a centre of airship construction.



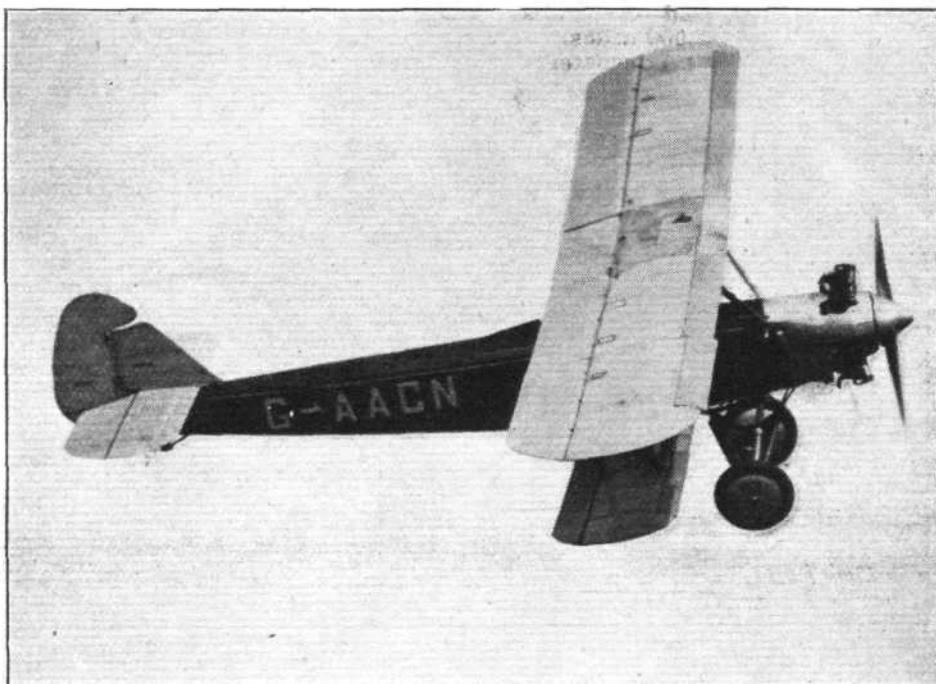
# HANDLEY PAGE TYPE 39

## Guggenheim Competition Machine

ONE of the articles in last week's issue of THE AIRCRAFT ENGINEER (Monthly Technical Supplement to FLIGHT) was by Mr. Russell, who is in charge of the Handley Page wind tunnel, and dealt with the subject of lateral control by means of automatic wing-tip slots and normal ailerons, interconnected slots and ailerons, and slot and "interceptors." In the Handley Page type 39 biplane built for the Guggenheim safe aircraft competition, the Handley Page slot is used in addition to give extra lift, not as in the early Handley Page experiments by mechanically-operated slots and flaps, but by automatic slots and flaps extending over the entire top plane. Thus the pilot is relieved, in this machine, of the work of operating the lift slots. To the best of our knowledge, this is the first time that the slot has been so employed on an actual machine (as distinct from wind tunnel model experiments), and this fact entitles the Handley Page "Gugnunc," as it is usually called, to inclusion in FLIGHT's gallery of new aircraft. That the machine did not win the Guggenheim competition, and that lawsuits and other forms of unpleasantness attended its appearance in America, is neither here nor there, and need not be taken into consideration when trying to form an idea of the merits of this particular use of slots.

The automatic wing tip slots have proved themselves, and have, although they may not represent the ultimate solution of the problem, "come to stay," at least for some considerable time. But, in addition, the slot may be used as a "lift slot" as well as a "stability slot," and it is of interest to discover whether, when so used, the slot is likely to become generally adopted. It has been pointed out in FLIGHT that when one comes down to fundamentals it is found that in effect what the slot enables one to do is to reduce the area (for a given landing speed) by reducing the chord only. The wing span is determined by considerations other than landing speed. For taking off and for climbing the span cannot be reduced beyond a certain limit if induced drag is to be kept down. That being so, it might be thought

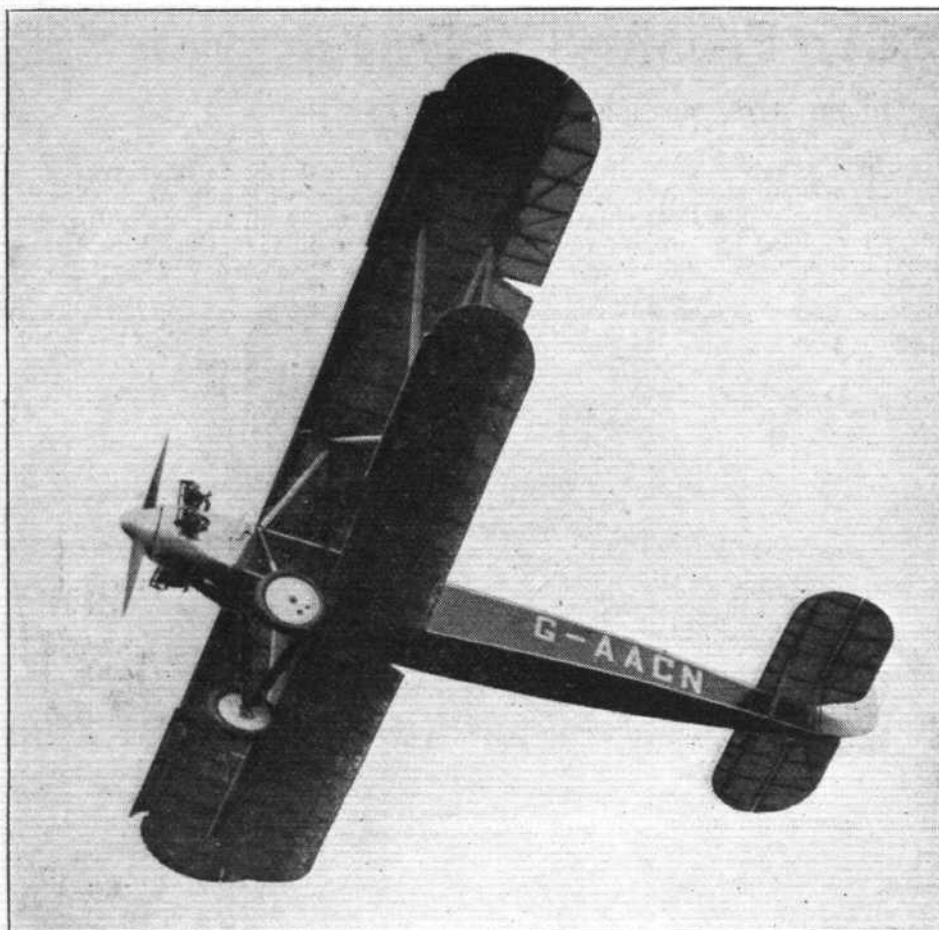
that the lift slot would not be likely to have very great advantages, and that a machine with automatic wing tip slots only could be designed to do all that the lift-slotted machine can do. It is not certain that this is necessarily quite true. For instance, a speed range of 3.36 to 1 (as the



"Gugnunc" has) is not easily achieved in an unslotted machine, and if one did manage to attain it, the machine would in all probability have a gliding angle so flat that it would be difficult for a pilot of only moderate skill to bring it into a small field. The "Gugnunc," when flying at large angles of incidence, has a very steep gliding angle because of the higher drag of the wing with slots open, and can, therefore, be brought down more *a la* Autogiro. Put in another way, with the system of lift slots a pilot of moderate skill can bring the machine down steeply without thereby reaching a high speed, much as the skilled pilot sideslips an ordinary machine. To us it seems that this



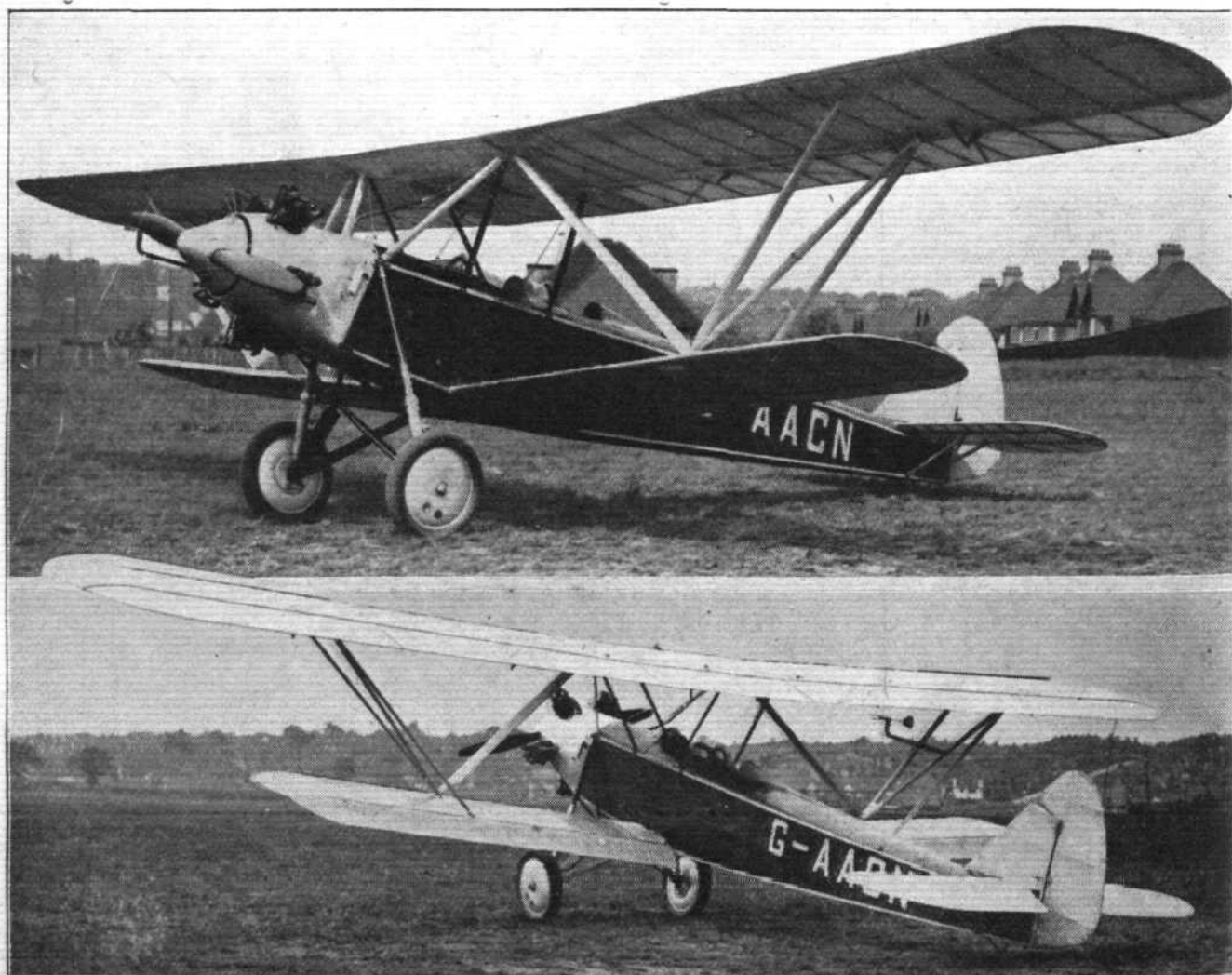
This side view of the Handley Page Guggenheim Competition machine shows very clearly the lift slots open and the trailing edge flaps down, in the position of maximum lift.  
(FLIGHT Photos.)



may be one of the chief features in favour of the lift-slotted aeroplane. That a substantial undercarriage of long travel is needed to take care of the vertical component of such a descent is obvious, but experience with the "Gugnunc" machine seems to indicate that such an undercarriage can be produced.

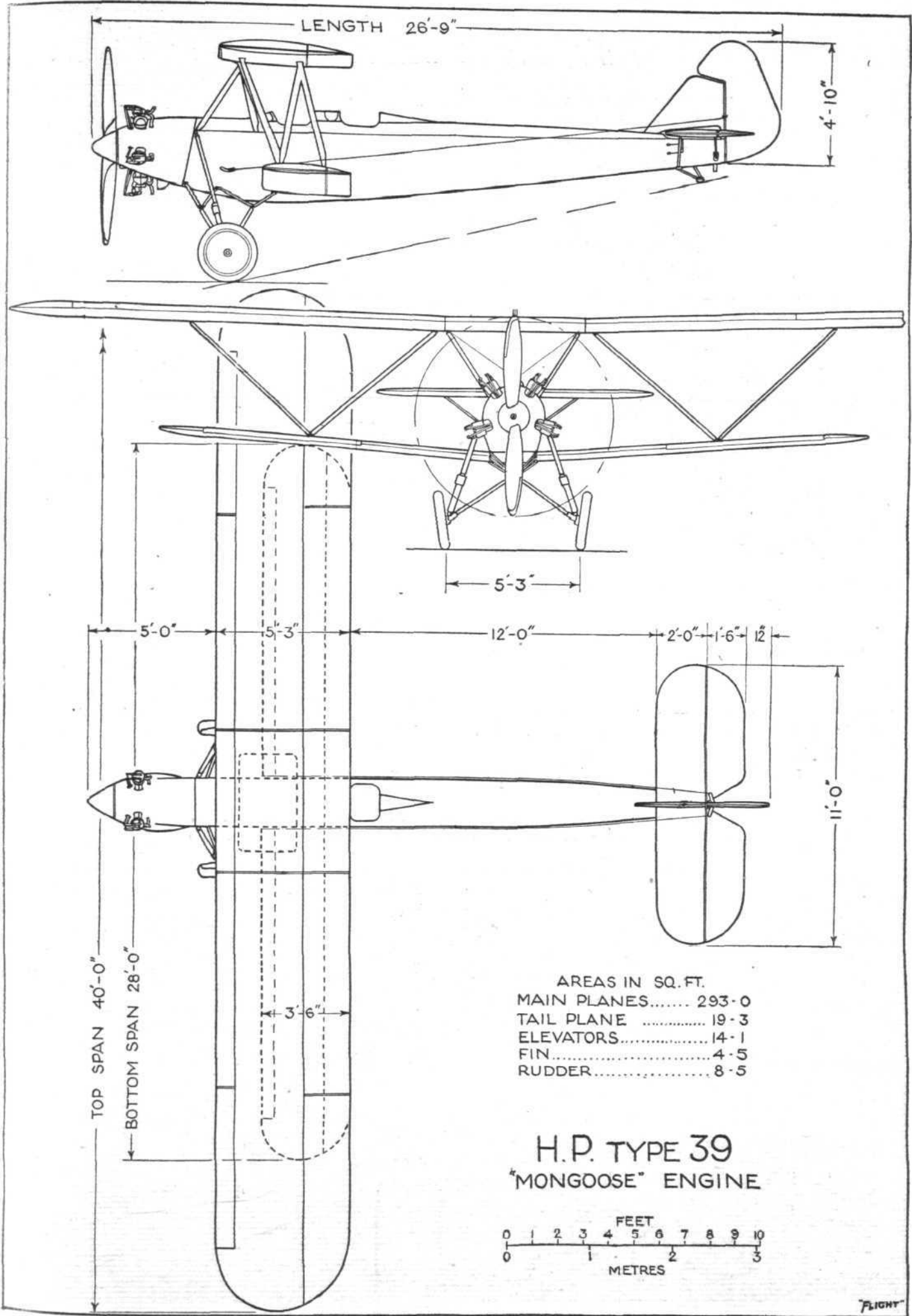
The price paid for the ability to make steep descents in safety, and at fairly low speed, appears to be extra horse-power when flying slowly, and, more important still, during a climb. In the illustration on p. 270, of horse-power available and horse-power required with wings normal, and with slots open and flaps down, the horse-power required curve is not continued beyond a forward speed of some 75 ft./sec. (51 m.p.h.), which is probably below the speed corresponding to greatest rate of climb. However, enough of the curve is included to show that the distance between horse-power required and horse-power available curves is smaller than for the normal wing. Roughly, it looks as if the power reserve available for climb would be 55 h.p. for the "normal" wing, and 40 h.p. for the wing with slots open and flaps down. The curves, it should be pointed out, were not "estimated" by us, but were supplied by the Handley Page company.

In the "Gugnunc" the slots extend over the whole span of the top plane, as do also the trailing edge flaps, but near



Further views of the Handley Page Type 39, with Armstrong-Siddeley "Mongoose" engine. (FLIGHT Photos.)

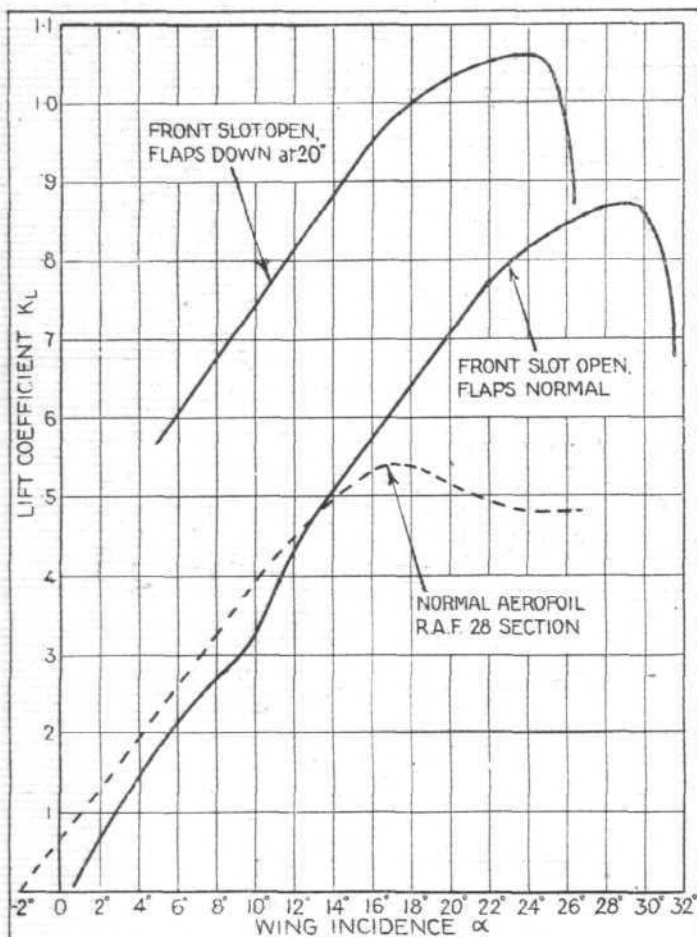




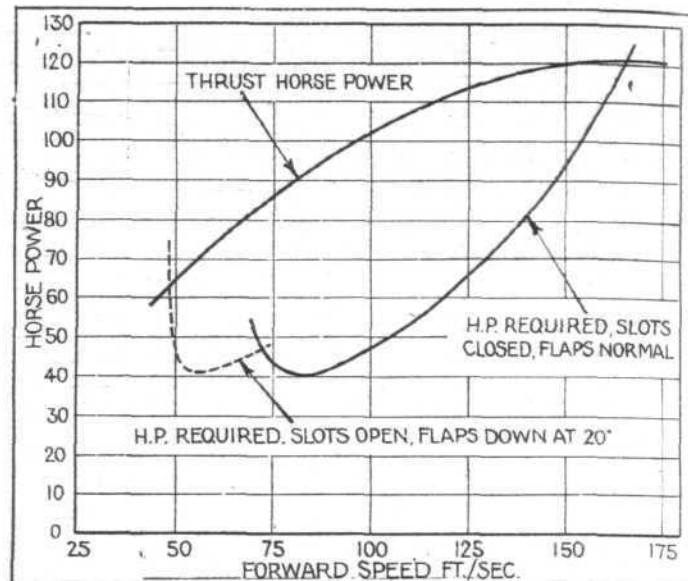
THE HANDLEY PAGE TYPE 39 : Three-view general arrangement drawings.

the wing tips the slots are of the usual automatic type, not linked to the flaps, the latter being ordinary ailerons. Over the inner portion, however, the slot is still entirely automatic in action, but is connected to the trailing edge flap, the automatic opening of the slot pulling the flap down. The

increase in lift thus obtained is shown in the other graph on this page. The lateral stability at large angles which is a result of fitting automatic wing tip slots is retained in the "Gugnunc" by the fact that the middle portion (lift) slot, is loaded by the flaps, which tend to keep it closed, and



These curves show the increase in lift obtained with a combination of front slots and trailing edge flaps.



Horse-power available and required curves of the Handley Page Type 39.

therefore, opens later than the wing tip slots. The fundamental wing section used is R.A.F. 28.

Structurally the "Gugnunc" is a perfectly normal machine, which does not call for any special comment. Its tare weight is 1,362 lb., and the gross weight is 2,150 lb. The maximum speed has been officially measured to be 112.5 m.p.h., and the minimum speed is 33.5 m.p.h. The initial rate of climb is 570 ft./min. The engine fitted is an Armstrong Siddeley "Mongoose" of 150 h.p. The wing loading is 7.3 lb./sq. ft., and the power loading 13.75 lb./h.p. The value of the Everling High-speed Figure is 18.9, which is quite good, and indicates that the drag coefficient at top speed (*i.e.*, minimum drag with slots closed and flaps up) is fairly small.

## TROOP-CARRYING UP TO DATE



The latest version of the Vickers Victoria is fitted with two Napier "Lion XI" engines and Handley Page automatic slots. (The wheels under the tail skid are temporary, and not permanent fittings!)

# ARMSTRONG- SIDDELEY JAGUAR MAJOR

## New Geared Engine

THE Jaguar Major is the name applied to the latest engine to be produced by the Armstrong-Siddeley factory at Coventry. As its title suggests, the new engine is a natural development of the famous Jaguar, its special claim to attention being the fact that although its over-all diameter is approximately the same as that of the Jaguar, its power output is considerably more. This increase of power has been attained by increasing the bore from 5 in. (127 mm.) to 5.25 in. (133.3 mm.), with a result that the cubic capacity has gone up from 1,513 cu. in. (24.80 litres) to 1,667 cu. in. (27.31 litres).

In the production of this engine two courses were open to the designers. One was to produce an engine of the same power as the Jaguar, but to save as much weight as was possible. The other was to take the Jaguar as a guide and without increasing the weight to produce a more powerful model. The Armstrong-Siddeley engineers chose the latter course, and the fact that the Jaguar Major weighs so little more than the Jaguar indicates how well they succeeded in their task.

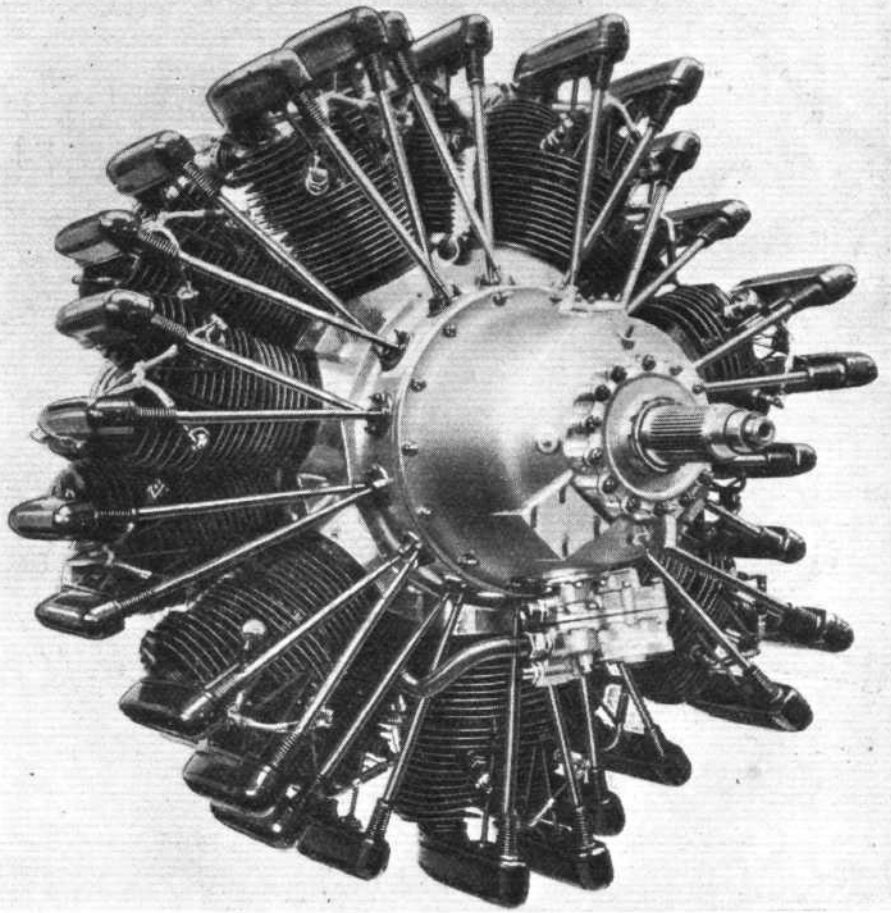
The new engine is made with a reduction gear which is very similar to that used on the Jaguar, and can be obtained either with a geared fan or supercharger. With the former its performance is more than 10 per cent. better than that of the standard Jaguar, owing to the slight supercharging effect of the fan. The engine in this form is declared at 525 h.p. at 3,000 ft., although it is possible to run it at full throttle on the ground for short periods when it develops 600 h.p. at 2,200 r.p.m. The supercharged edition is declared at 500 h.p. at 11,500 ft.

As will be seen from the illustrated description which follows, the general design of the engine closely follows the well-proved Armstrong-Siddeley standard practice. It will be noted, however, that here and there small modifications have been introduced where deemed desirable, among which may be mentioned the incorporation of the rear cover with the engine bearer flange. It will also be seen that the rear of the engine has been arranged to take either a hand, inertia or gas starter, and that provision has been made for dealing with a two-gun gear, dynamo drive, a spare drive and an auxiliary gear pump for the rotor drive.

The accompanying series of illustrations shows the general arrangement of the engine.

Take the crank-case (Fig. 1). It will be seen that the front of it accommodates the housing for the front main bearing and the rear is open to accommodate the diaphragm plate. The mouths into which the cylinders fit are well webbed and accommodate the adaptors, which are threaded to take the cylinders. Fig. 2 shows the complete master rod and cap half and the way in which the auxiliary rods are located in them by anchor pins. The master rod and cap half are held together by bolts, which also position the grooved anchor pins and thus encircle the crankshaft big end bearing. The crankshaft itself is shown in Fig. 3, one master rod and six auxiliary rods being located on each throw. The same illustration shows the phosphor-bronze balance weights, (which are bolted and riveted to the webs), the front and rear bearings, the timing gear drive and the splines for the internal gear.

As already mentioned, the rear of the crankcase is sealed by the diaphragm plate, the details of which differ slightly



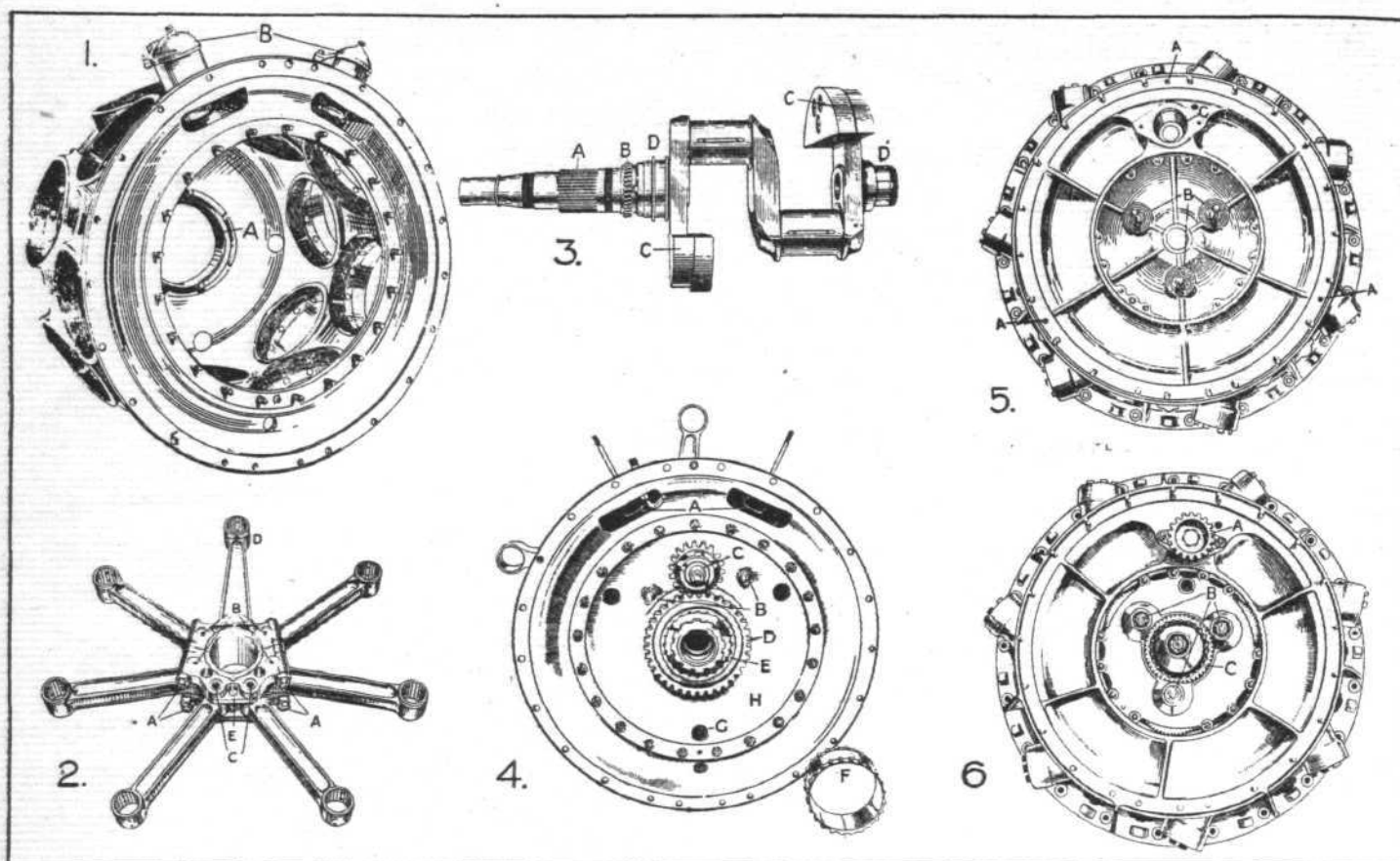
according to whether the engine is to be of the supercharged or geared-fan type. Fig. 4 shows the diaphragm plate for the supercharged engine, while Figs. 5 and 6 are two views of the front of the induction case, behind which is found the supercharger. On p. 272 the diaphragm plate for the geared-fan type of engine is shown in position in Fig. 7, and the front and rear of the induction case for the geared fan are shown in 8 and 9. The method of driving the supercharger and geared fan is, therefore, easily followed by referring to these illustrations. In both cases a gear on the rear end of the crankshaft drives the small auxiliary idler shaft gear. In the case of the supercharger there is a coupling sleeve which transmits the drive from the gear on the rear end of the crankshaft to the supercharger main driving gear, which is located on the back gear plate on the front of the induction case. The supercharger main driving gear meshes with the three big satellite gears and transmits the power through slipping clutches and through three more gears to a gear which forms part of the rotor spindle.

In the case of the geared-fan type there are two gears mounted side by side on the rear end of the crankshaft. The front or larger gear drives the auxiliary idler gear. The rear or smaller one meshes with the smaller gear of the intermediate fan gear assembly. The latter incorporates a slipping clutch, and its larger gear wheel drives a gear mounted on the end of the fan-shaft, the fan, like the supercharger, being contained in the induction case, which in both models is finally sealed by the induction casing rear cover, the latter being formed with a number of faces to which the carburettor mixture pipe, magnetos, and auxiliary drive units can be attached.

The mixture enters the centre of the induction casing cover through a fixed guide vane, and is then thoroughly atomised and distributed outwards by the fan or rotor to the seven Y-shaped induction pipes, each horn of the "Y" fitting one inlet port of the cylinders. A feature of the induction system is that part of the mixing chamber between the carburettor and the induction case is jacketed by oil, the mixture cooling the oil and the oil heating the mixture to their mutual advantage.

Turning now to the front of the engine, one finds that the space between the front wall of the crankcase and the intermediate bearing housing is occupied by the cam drum, cam-gear carrier, oil-pump driving bevel, and tappets (Figs. 13 and 14). The intermediate bearing housing (Fig. 14) encloses this mechanism besides forming a housing for the intermediate bearing. The forward end of the crankshaft





THE "JAGUAR MAJOR": Fig. 1 is an interior view of the crankcase, showing (a) the front bearing housing, and (b) the breathers. Note the crankcase adaptors into which the cylinders are screwed. Fig. 2, the master rod (d) and cap half (e) are bolted together by fixing bolts (a). (b) are the grooved anchor pins holding the auxiliary rods, and (c) are the plain anchor pins holding the auxiliary rods to the cap half only. In Fig. 3 is shown the crankshaft, with the splines (a) for the internal gear, (b) the timing gear drive, (c) balance weights, and (d) front and rear main bearings. Fig. 4, the rear diaphragm (h) on the supercharged engine. (a) are the breathers, (b) the oil leads to the back gear, (c) the auxiliary idler shaft, (d) the crankshaft gear, (e) the serrations for the universal sleeve, (f) and (g) the oil drain hole. Fig. 5 shows the front of the induction case with back gear plate removed. The holes which take the extracting screws are shown at (a), the spindles and bearings for the rotor driving gears at (b), and the hole for the auxiliary drive at (c). Fig. 6 shows the supercharger drive. (a) is the auxiliary drive gear, (b) the back gear spindles, and (c) the driving gear.

is splined to accommodate the internal gear of the reduction gear (Fig. 15), this being fitted after the intermediate bearing housing has been placed in position. The bearings for the sun gear follow, the whole being then securely locked up. The airscrew shaft, which is formed in one piece with the satellite gear carrier (Fig. 16), is added next complete with its five satellite gears, and the unit is finally completed by the reduction-gear front cover, which incorporates the stationary gear with which the sun gear on the front end of the airscrew shaft engages.

From the foregoing it will be seen that the body of the engine is composed of the crankcase, accommodating the cylinders, crankshaft, master and auxiliary rods and pistons; that the timing gear is enclosed in front by an intermediate bearing housing, and that in front of this is fitted as a single, easily detachable unit, the 3 to 2 reduction gear; that the rear of the crankcase is sealed by the diaphragm plate, and that the space enclosed by this rear face of the crankcase and the front face of the induction casing accommodates the gear for operating the auxiliary drive and for the supercharger or geared fan. The induction case is attached to the rear of the crankcase, and between its polished and specially shaped walls houses in one case the rotor for the supercharger and in the other the geared fan. The rear wall of this chamber is removable, and its rear face provides a means for attaching the auxiliary drives, the accessories, and the intake from the carburettor.

**The Crankcase.**—The front wall of the crankcase accommodates the front main outer roller race, which is secured from the inside by a spring ring which fits into a groove in the race housing, the latter being shrunk into the case and held by a lock ring which is riveted over. The tappet guides are arranged radially round the

front of the case, being pushed in from the outside and being secured by nuts and split-pins to their bolts, the inner ends of which are flattened to prevent their turning. The tappet is prevented from leaving its guide by a circlip on its outer end, while the roller on its lower end prevents it from being withdrawn outwards. The roller runs on a floating pin housed between the cheeks of the lower end of the guide, the guides being cast in pairs and accommodating one inlet and one exhaust tappet.

**The Master Rod.**—The master rod and the auxiliary rods are of "H" section steel, the lower ends of the auxiliary rods accommodating bushes and being fitted between the machined faces of the cheeks of the master rod and cap half, with a spacing washer interposed between each cheek and the end of the bush. The wrist-pins are tapped through the cheeks and end of the auxiliary rods and are held by the fixing bolts which register with grooves in the wrist pins and unite the cap-half to the master rod. In the case of the two middle auxiliary rods in the cap half the wrist pins are driven in and secured at each end by circlips, the pins being shouldered, and consequently only being able to enter one way.

**The Crankshaft.**—The crankshaft is of the two-throw type, phosphor-bronze balance-weights being bolted and

riveted to its webs. Around each throw are disposed one master and its six auxiliary rods, the master rod being held to the cap half by four fixing bolts. The crankshaft is hollow, its webs being sealed by duralumin plugs which are driven into position and located by grub screws. In assembling, the master rod and master ring are split and the crank is dropped down into its front roller bearing, the two master rods and the cap halves being then built up round the crank.

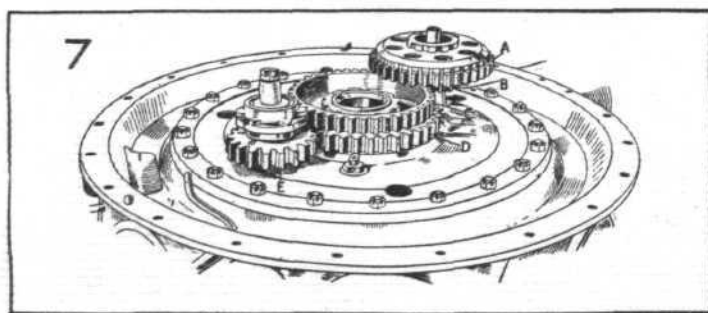


Fig. 7: The diaphragm plate of the geared fan type engine. (a) is the intermediate fan gear, (b) the clutch support, (c) the clutch driving gear, (d) the auxiliary driving gear, and (e) the auxiliary idler gear.



*The Cylinders.*—The cylinder barrels are machined all over from steel forgings and are screwed and shrunk into the aluminium alloy cylinder heads, the joint being completed by a nut which acts as a radiating fin and is threaded on to the cylinder before shrinking into the head. This nut has a taper seat and screws down on to a corresponding taper on the cylinder head, the angle of the taper being such that the nut remains tight despite the varying expansions of the two different materials locked together. Each cylinder has two overhead valves, the inlets being made of stainless steel and the exhausts of cobalt chrome. They are returned to their seats by duplex springs which with the rocker arms are enclosed in easily detachable streamlined covers. Each valve with its rocker arm and rocker support bracket lies in the plane of the push rod so that there is no side load and the rocker bracket can be of small section and

**Armstrong-Siddeley "Jaguar Major" Geared Engine**

Type .. .. .	Air-cooled radial, geared
Number of cylinders .. .. .	14
Direction of rotation .. .. .	L.H. tractor
Bore .. .. .	5.25 in. (133.3 mm.)
Stroke .. .. .	5.50 in. (139.7 mm.)
Swept volume .. .. .	1,667 cub. in. (27.31 litres)
Diameter overall .. .. .	46.75 in. (1.187 m.)
Length overall .. .. .	61.6 in. (1.564 m.)
Normal engine r.p.m. .. .. .	2,000
Normal propeller r.p.m. .. .. .	1,314
Maximum propeller speed above normal .. .. .	10 per cent.
Rated power (geared fan) .. .. .	525 b.h.p. at 3,000 ft.
Rated power (supercharged) .. .. .	500 b.h.p. at 11,500 ft.
Actual normal power at sea level (geared fan) .. .. .	525 b.h.p.
Actual normal power at sea level (supercharged) .. .. .	400 b.h.p.
Weight with two magnetos, carburettor, air intake, propeller hub and tachometer drive—	
Geared fan .. .. .	985 lb. (447.7 kg.)
Supercharged .. .. .	996 lb. (452.7 kg.)
Weight/rated h.p. (geared fan) .. .. .	1.75 lb. (0.79 kg.)
Weight/rated h.p. (supercharged) .. .. .	1.98 lb. (0.9 kg.)
Fuel consumption/rated b.h.p./hour .. .. .	0.6 pints (255.6 gr.)
Oil consumption/hour .. .. .	9-12 pints (4.5-6.0 kg.)
Oil pressure .. .. .	60-100 lb./sq. in. (4.22-7.03 kg./cm. <sup>2</sup> )
Compression ratio .. .. .	5.0 : 1

so offer little head resistance. The lid of the streamlined rocker cover is securely held in position by a spring and is quickly removed by hand without the aid of tools to expose the rocker for top adjustment. To adjust the tappet clearance it is only necessary to slacken the clamping screw on the end of the rocker and turn the threaded cup in the rocker until the necessary adjustment is obtained. In a recess in the threaded rocker cup is sprung a hardened steel disc radiused on both faces with the radii disposed at right angles to each other. The flat end of the tappet rod bears on this washer and forms a universal joint in which rubbing and consequent wear are practically eliminated.

The cylinder barrels screw into steel adaptors in the mouths of the crankcase, the adaptors being flanged on the inside of the case and pegged to it when their correct position has been determined. Each cylinder is screwed down on t

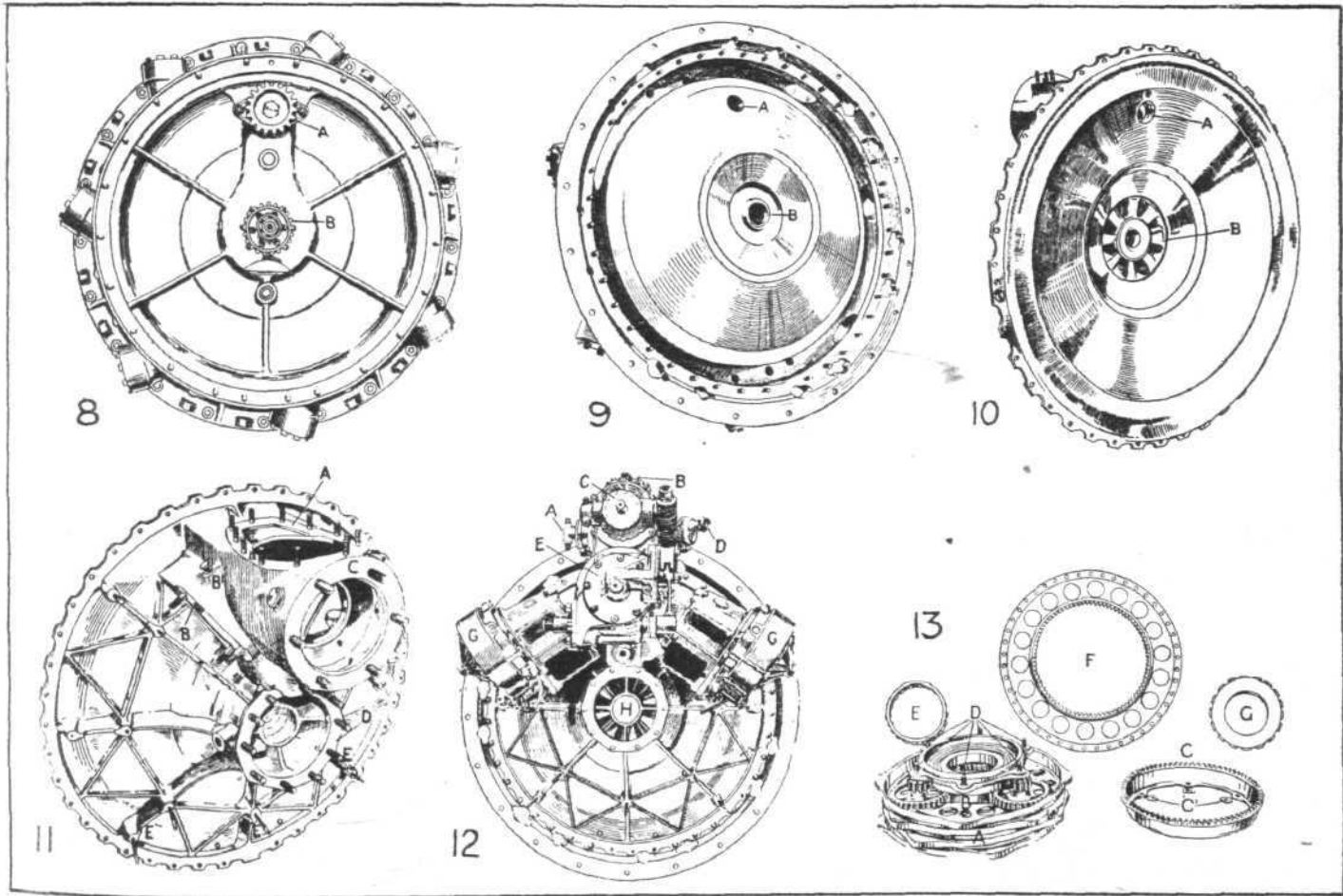


Fig. 8 shows the front face of the induction case of the geared fan type engine, with (a) the auxiliary and starter drive, and (b) the fan gear. The rear of the induction case (geared fan type) is shown in Fig. 9. (a) is the hole for the auxiliary drive, and (b) the hole for the fan shaft. The front of the supercharger cover is shown in Fig. 10, where (a) is the hole for the auxiliary drive shaft, and (b) the fixed guide fan. Fig. 11, induction casing rear cover showing (a) auxiliary drive face, (b) and (b1) magneto drive face and set screw, (c) hand or inertia starter face, (d) induction face, and (e) wire carrier clip studs. The arrangement of the accessories on the supercharger rear cover is shown in Fig. 12, where (a) is the oil pump (b) the gas distributor, (c) the spare drive shaft, (d) the tachometer drive, (e) hand or inertia starter, (g) magneto, and (h) fixed guide vane. Fig. 13, (a) cam drum, (b) cam gear carrier, (c) oil pump driving bevel with (c1) its adjusting washers fitted on studs (d), (e) the roller race for (b), (f) the timing plate, and (g) the cam gear locknut.

a loose split ring, the faces of which are conical at each end. When the cylinder is screwed down and in correct alignment the clamping screw of the split ring is tightened, the drawing in of the two tapers rigidly securing the cylinder with an evenly distributed load all round the flange.

**The Diaphragm Plate.**—The rear of the crankcase is sealed by the diaphragm plate which is registered with the crankcase by a dowel pin. The plate houses the rear roller bearing of the crankshaft, on which is keyed the crankshaft driving gear, which is then secured by a ring nut located by a pin. In the case of the supercharged engine there is a single gear wheel and a coupling sleeve, but in the case of the geared fan type there are two gear wheels of different sizes bolted together side by side, the smaller of the two gear wheels driving a smaller wheel of the fan clutch driving gear. The drive then passes through friction clutches which are incorporated in the gear assembly to the larger wheel of the fan clutch gear which drives the gear on the end of the fan shaft. The larger of the two gear wheels on the rear end of the crankshaft drives an idler gear which engages with the gear in the induction case driving the auxiliary shaft.

**The Timing Gear.**—The cam drum and satellite gears which are carried on a roller bearing on the front end of the crankshaft comprise four rows of cams located side-by-side. The stationary gear fits over the three cam drive gears, the crankshaft locknut securing the whole in position. In front of this unit is found the oil pump driving bevel gear which is secured by studs in the cam drum. The timing gear is enclosed by the intermediate bearing housing, the phosphor bronze bearing being shrunk in, split pinned and nutted to the aluminium housing which forms a support for the internal gear and also positions the crank.

**The Reduction Gear.**—The internal gear with its sleeve, which is slotted into position and completed at its front end with a split phosphor bronze cone, is mounted on the front end of the crank, the airscrew, roller race, locking ring, crankshaft locking nut, locking sleeve and spring ring following in the order named and the crank being thereby drawn up into its correct running position. The airscrew shaft bush follows next and the airscrew shaft and front cover assembly are dropped down on to the front end of the crankshaft so that the five satellite gears mesh with the internal gear.

The reduction gear itself is noted for its neat, sturdy and compact design. On the taper rear end of the airscrew shaft is a sleeve carrying the roller bearing which supports the sun gear, the fixed gear and race being found in the front cover. The satellite gears run on rollers, a distance piece being fitted at each side of each gear and the gear spindles being keyed to slots in the carrier's cheeks and secured with nuts and split pins. The sun gear complete with its race is

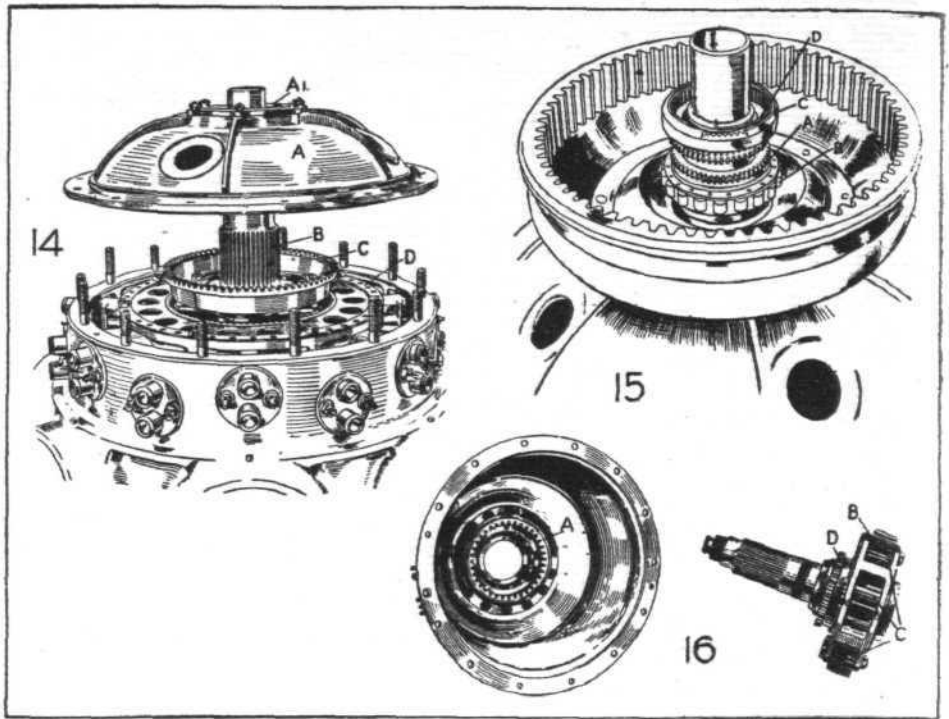


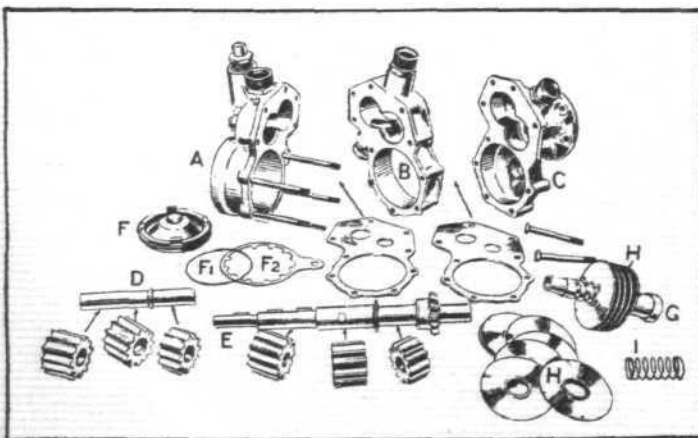
Fig. 14, the intermediate bearing housing (a) and bearing (a1), (b) the internal gear splines, (c) the oil pump driving gear, and (d) the timing plate. Fig. 15, the internal gear mounted on the crankshaft. (a) is the locknut, (b) the sun gear bearings, (c) the locking sleeve, and (d) the locking wire. Fig. 16, the reduction gear front cover showing (a) the stationary gear, (b) the airscrew shaft and carrier, (c) the satellite gears, and (d) the sun gear which meshes with (a).

mounted on the airscrew shaft and meshes with the stationary gear retained in the cover. The reduction gear drive is summarised as follows. The internal gear on the crankshaft drives the five satellite gears, the latter gears meshing with the sun gear which runs free on the airscrew shaft. The cage carrying the satellite gears travels round the sun gear and revolves with the airscrew shaft, the sun gear being held stationary by the fixed gear in the cover.

**The Supercharger.**—The supercharger is contained in the induction casing and induction casing cover. These two aluminium castings are spigoted, dowelled and held together by nuts, the whole being attached to the rear flange of the crankcase by a series of nuts and studs. Between the crankcase and the induction casing is the diaphragm plate which accommodates the rear bearing of the crankshaft and the main drive for the supercharger, this plate remaining on the engine when the supercharger is removed. The centre part of the front portion of the induction casing houses the gearing for the supercharger, substantial ribs extending from the edge of the casing to the central housing which is sealed by the gear support plate. The greater part of the rear portion of the induction casing is formed with a circular polished guide face, the function of which is to assist the gas on its way to the induction pipes. There is an annular space between the periphery of the polished guide face and the rim of the induction casing to accommodate mouths in which the lower ends of the induction pipe are held by gland packings and gland nuts. A row of studs is provided on the edge of the casing for the attachment of the induction casing rear cover, the flange being drilled to accommodate bolts which hold the engine to the aircraft. The front face of the induction casing cover is also polished to facilitate the passage of gas. Its centre houses the fixed guide vane which is a tap fit secured by a circlip. The function of the guide vane is to direct the gas on to the blades of the rotor. The rear side of the induction casing cover incorporates the housings for the auxiliary drive casing (on top), the magnetos (at the side), the hand starter (at the rear), and the heater box and carburettor (at the base).

The supercharger drive can be summarised as follows. The gear wheel on the rear end of the crankshaft drives the coupling sleeve which in turn drives the supercharger main driving gear. The latter drives the three satellite back gear wheel pinions, which incorporate spring-loaded clutches and drive a gear on the front end of the rotor spindle. The rotor runs 12.9 times as fast as the crankshaft, and in the same direction.

**The Geared Fan.**—The geared fan is disclosed by removing the rear cover from the induction casing, its drive being



The oil pumps stripped, showing (a), (b) and (c) the three housings, (d) the idler shaft with its pinions, (e) the driving shaft with its pinions, (f), (f1), and (f2) the filter cap, locknut and spring, (g) the filter tube with its spring (i) and (h) the gauze filters.



taken from the ear crankshaft gear to the smaller gear wheel located with the phosphor-bronze clutch pads which in turn are housed in the fan driving gear. The smaller gear wheel is free on a sleeve which is supported on a spindle by ball and roller bearings. The action of centrifugal force causes the pads to press tightly against their seating and transmit the drive to the fan driving gear.

*The Auxiliary Drives.*—The auxiliary drive case incorporates gears for driving the gear (at the rear), the gas starter (at the top), the circulation pump which supplies the gears with lubricant (on the port side), the tachometer drive (which can be fitted either on the port or starboard side), an auxiliary oil pump for supplying oil to the supercharger rear bearing (on supercharged models only) (on the port side), and a petrol pump (on the starboard side). In some cases the petrol pump is replaced by the tachometer drive and the supercharger pump drive by the tachometer, while in other cases the gears not required are blanked off with aluminium plates.

The magnetos are held by studs and nuts to flanges incorporated with the rear cover, their shafts being driven by bevel gears through the medium of spring drives. The housing of each spring drive is located by a set screw and shims are provided to ensure the correct backlash in the drive.

**The Oil Pumps.**—The oil pressure and scavenge pumps fit on to the front cover, and are composed of three aluminium castings which form the housing for the pump gears and the oil filter. Steel distance plates, which support the gears and gear shafts, are located on either side of the central casting.

The driving shaft is carried on a phosphor-bronze bush pressed into that part of the pump which is attached to the front cover. Keyed to it are three aluminium gear wheels. This part of the case also accommodates one of the three driven gears, and one end of the driven shaft on which the three driven gears run free.

A steel distance plate separates the pressure pump from one of the scavenge pumps which is housed in the centre portion, the driving and driven shafts each carrying an aluminium gear wheel, the former keyed, the latter free on

the shafts. This scavenge pump's housing is completed by a steel distance piece.

The third portion of the pump housing contains a second scavenge pump, the arrangement of gear wheels and shafts being similar to that already described. Bolts and studs in this portion of the pump pass through the centre and top parts, and their nuts lock the three pieces together.

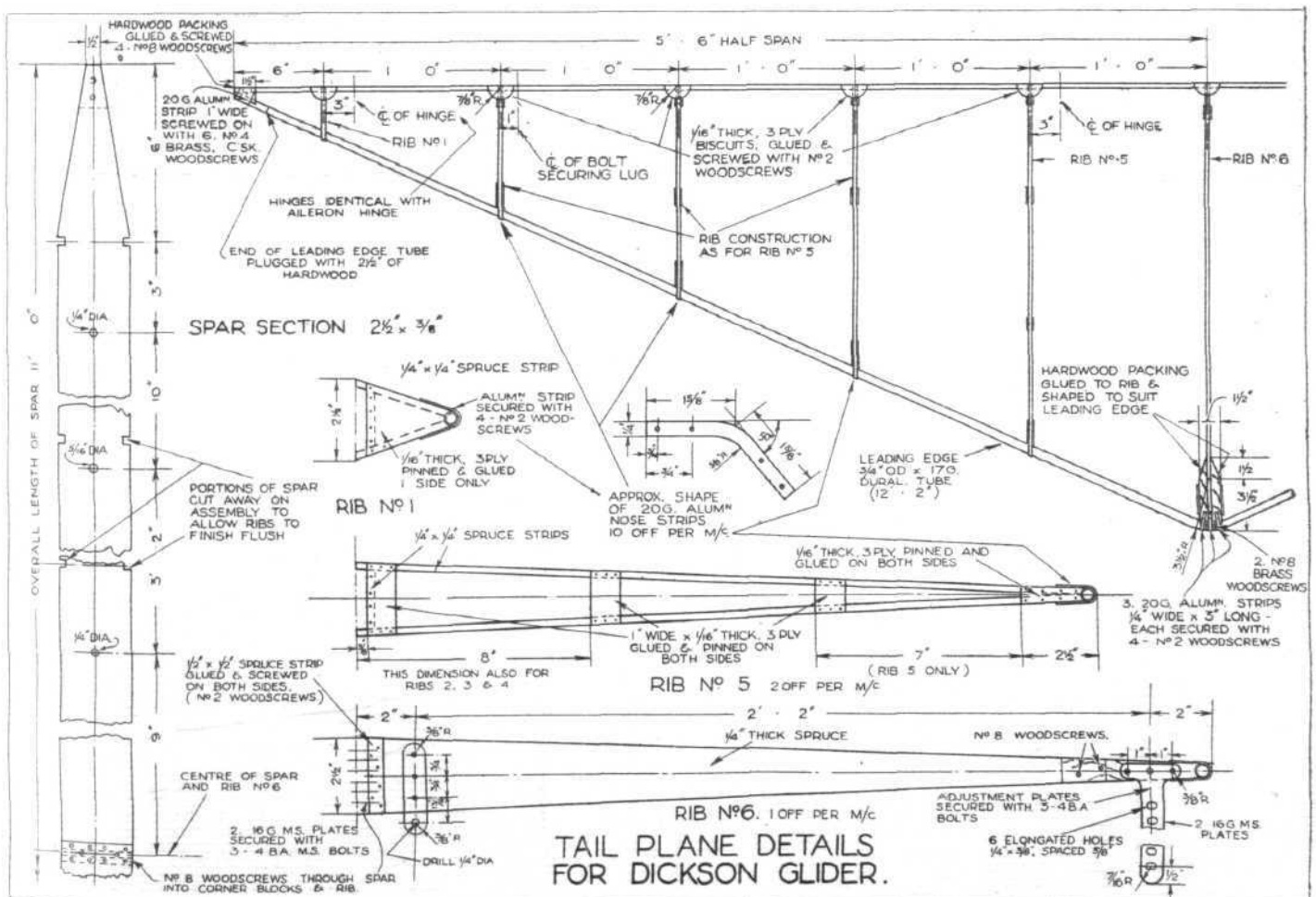
At the side of the three pump gear housings is found the filter chamber, the lower end of which is sealed by a cap secured by a locking plate and ring. The filter consists of the filter tube which is located between the cap and top portion of the pump casing. The filter tube is made with an external spiral groove, and is drilled transversely at frequent intervals. Twelve filter gauze discs are dropped on to the tube and located by a spring in the top casting. Should the pressure be excessive owing to the choking of the gauzes, the tube will lift against this spring, unseat the hole in the cap and allow the oil to pass direct up the centre of the tube.

*The Oil-pressure Relief Valves.*—The pressure relief valve screws into the base of the pump. The pressure is increased by inserting shims in the valve body under the spring, and thus increasing its tension. The other end of the spring bears up against a cup which, when depressed by the pressure of oil, uncovers a port which enables the oil to pass back into the pump. Between the filter chamber and relief valve is a cap which covers the end of the driving spindle. The latter has a screwdriver slot, which is used for testing the backlash in the gears when mounted on the engine.

**How the Oil Circulates.**—The passage of oil through the pump is as follows. From the tank the oil passes to the pressure pump, thence to the filter, and then into the crankshaft. The middle pump draws oil from the reduction gear and delivers it back to the tank.

The bottom pump takes oil through a sump on the crankcase, and delivers it back to the carburettor jacket, and thence to the tank.

*The Filter.*—The oil passes through the filter gauzes through the small holes in the centre ring of the gauzes, into the tube, through the top casting into the main driving shaft, and thence through a plain bearing into the crankshaft.



**A further set of details of the Dickson Glider.**

# PRIVATE FLYING AND CLUB NEWS

## THE FIRST MEETING OF THE YEAR

**T**HE BROOKLANDS SCHOOL OF FLYING opened the season with their meeting on Sunday, March 2.

The weather was poor, with low clouds and bad visibility, but over forty machines turned up, and the local populace showed that they, too, have not lost their interest in flying, in spite of their proximity to Brooklands; they came in astonishing numbers, and though cold, seemed to enjoy themselves thoroughly. No doubt the presence of the cast from "Silver Wings" of the Dominion Theatre tended to increase their interest largely, as somehow the idea of seeing actors and actresses off the stage never fails to "draw." The said cast were given joy rides in the School Avro's, and

A short but very comprehensive programme was arranged with aerobatics and crazy flying by such experts as Ft.-Lt. T. Rose, Capt. H. Broad and Mr. G. Murray; an exhibition of "wing walking" by Jock Anderson; a parachute descent by Mr. John Tranum, and, finally, "bombing the car" by Capt. H. D. Davis and E. A. Jones. All these items went off excellently, and sustained the interest during the afternoon. Several of the visiting pilots also put up a show as they arrived over the aerodrome, and toward the latter part of the day the Hawker Hart was taken up by Ft.-Lt. P. W. S. Bulman, who showed us what a modern two-seater bomber can do.



**SILVER WINGS!** "staged" by the Brooklands School of Flying and "produced" by order of Capt. H. A. Davis.

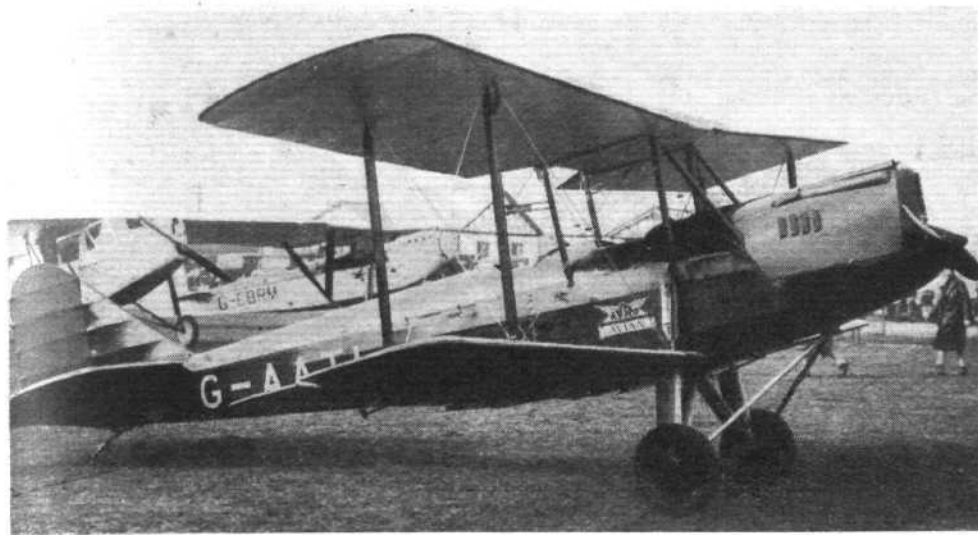
duly had their photograph taken with the comedian making an abortive attempt to start the engine of a Moth by swinging in the reverse direction!

Besides the members of "Silver Wings," there were also many members of the B.A.R.C. present, and the interest roused by the many magnificent sports cars at times



**EYES UP!** Capt. Broad's spectacular inverted climbing turns cause many stiffnecks. (FLIGHT Photos).





**A HERMES AVIAN:** Henlys, Ltd., of Piccadilly, have bought this Avian for their aviation representative.

threatened to outdo that shown in the aircraft. Altogether it was a very cheery and enjoyable afternoon, and augured well for the many meetings which are announced for the coming season.

The Brooklands School are always expected to run such a show well, and this time they still further enhanced their reputation, and a fitting outcome is the announcement that Mr. Reginald Pole has presented them with a cup which will be presented for a race from Brooklands to Brighton and back, the full details of which will be made public later.

During 1929 over 2,000 hours' instructional flying were given at Brooklands, and more than 40 pupils took their "A" licences, and this without a single accident to man or machine. It was unfortunate that the vagaries of the wind should cause Mr. Trnum to drift out of sight of the crowd when landing from his jump with his Russell Lobe Parachute, and still more unfortunate that he should have to come down on the edge of the sewage farm. However, he was soon up and back among the crowd smiling, as he always is on such occasions.

**THE AIRCRAFT CLUB, HARROGATE**, has the advantage of having a member who has recently been to Germany and who will shortly read a paper entitled "Notes on Practical Gliding," which is largely the result of his latest visit. The Club has now started their Model section, and will hold an open competition on Saturday, April 5. Entries should be sent to the Secretary and marked "Model Competition"; the chief prize will be given for duration.

**THE CINQUE PORTS FLYING CLUB** held their second monthly competition for the Ashwell-Cooke Challenge Cup on Sunday, March 2. The entries were disappointing, as at the last minute Mr. Scott-Taggart and Mr. Law found that they were unable to be present, which left only two entries in the persons of Mr. Calvert and Mr. Dallas Brett. Mr. Wynne, the Club's ground engineer, who has only 3½ hrs. solo to his credit, therefore sportingly offered to join in order to increase the numbers and having done so proceeded to run away with the Cup!

He scored 51 on his first and 75 on his second attempt, while Mr. Dallas Brett was disqualified on both attempts by undershooting and Mr. Calvert was disqualified by undershooting first and then overshooting. The Club hopes that many more private owners from the South of England will patronise these competitions in the future, as otherwise they may have to cancel them altogether. The aerodrome is only one hour from London by air and special arrangements have been made with the Air Ministry whereby only one landing fee will be charged per machine for the afternoon, e.g., 2s. 6d. and the entrance fee for the competition is only 5s., so that the costs cannot be considered large.

The next competition will be held on Sunday, April 6, at 2.30 p.m., and copies of the rules can be obtained from the hon. secretary, 114, High Street, Hythe, Kent.

**MISS SICELE O'BRIEN** is reported to have fully recovered from her accident over a year ago and to have had her "A" licence renewed and to be flying again.

**THE GODSTONE TOWN-PLANNING COMMITTEE** evidently learnt the arguments used against Stephenson when he first proposed his railways, before they considered the question of the new aerodrome at Addington, but they have not learnt any lesson from the subsequent history of that pioneer. They therefore passed a resolution refusing permission to Henlys, Ltd., to establish an aerodrome at Addington. Their main argument seems to have been that an aerodrome on this site would injure the amenities of the district, and the chairman of the Rural District Council protested against what he called "the sterilisation of an area town-planned for private houses. The company," he submitted, "had no national object. It was a case of mere flying for rich people." We wonder whether he said the same when it was originally suggested that garages should be

erected in his district; no doubt, the argument that facilities for servicing his car were not necessary, as car-driving was mere travelling for pleasure, would be to him quite logical, but since the said garages have brought much trade to Godstone, it seems somewhat short-sighted on his part not to realise that the establishment of an aerodrome there would not only bring flying visitors but must, obviously, tend to make just those rich people, to whom he refers, consider Godstone as a suitable place in which to live, since when they have finished in the City they will be able to go out of their back door, and fly, and surely the attraction of rich people to a district is to be desired.

Everyone who understands the case from the flying point of view seems to be in favour with the scheme, and the airline companies and Croydon Aerodrome authorities are in entire agreement that an aerodrome such as Addington would relieve the Croydon Aerodrome of light aircraft traffic, a matter which is rapidly becoming a necessity, since the volume of air-line traffic is increasing fast. However, district councils are proverbially not business men, and only such with a clear vision of the future can be expected to be "full-out" for such a new-fangled craze as flying!

**THE LONDON AEROPLANE CLUB** raffle for the D.H. Gipsy Moth will take place at the Club, Stag Lane Aerodrome, on Sunday, March 23, at 2 p.m. All members interested are invited to be present.

**NATIONAL FLYING SERVICES** have announced the dates of their forthcoming air meetings as follows:—April 5, Reading; April 12, Hull; April 21, Hanworth; April 26, Leeds; June 7, Reading; June 15, Nottingham; July 5, Hanworth; July 13, Leeds; July 19, Hull; September 27, Hanworth.

The Berks, Bucks and Oxon Club will hold a ball at the Reading Town Hall on the eve of their pageant, to which all visiting pilots will be welcomed. Additional meetings will also be held at Nottingham and Stoke-on-Trent on dates to be announced later. Mr. D. L. Eskell, formerly traffic manager for Imperial Airways, has joined the staff of N.F.S. as traffic manager, and will take charge of the air taxi and joy-ride activities of the company.

**THE SIOUX LOOK-OUT WINTER SCHOOL** of Ontario Provincial Air Services has put up what must be a record for the operation of their Gipsy Moths. On the 32 consecutive days from January 9 two aircraft on skis flew 54 hrs. dual and 273 hrs. solo in an average temperature of 12° F. below zero, with a lowest of 42° below. During this time no failures of any kind were experienced and 10 pupils qualified for their commercial licences. Major Leech flew 500 miles from Sault Ste Marie in one day with the temperature at 30 to 42 below zero.

**THE LEICESTERSHIRE AERO CLUB** will be holding a Bridge Evening, in the Oriental Hall, Market Place, on March 22, at 7.30 p.m., tickets 4s. each, and the object is to raise a fund for buying furnishings for the Club house.

THE CIVIL AVIATION SECTION of the London Chamber of Commerce have recently had under consideration the question of the difficulties which are experienced by Flying Schools in competition with subsidised firms and clubs. They have made representations to the Secretary of State for Air, as follows:—

They fully agree with the application made to the Air Ministry by the Associated Light Aeroplane Clubs' General Council, urging continued assistance for approved clubs; whilst they also consider that a similar grant should be made to all unsubsidised clubs which may be approved by the Air Ministry, due regard being given to their territorial position and circumstances.

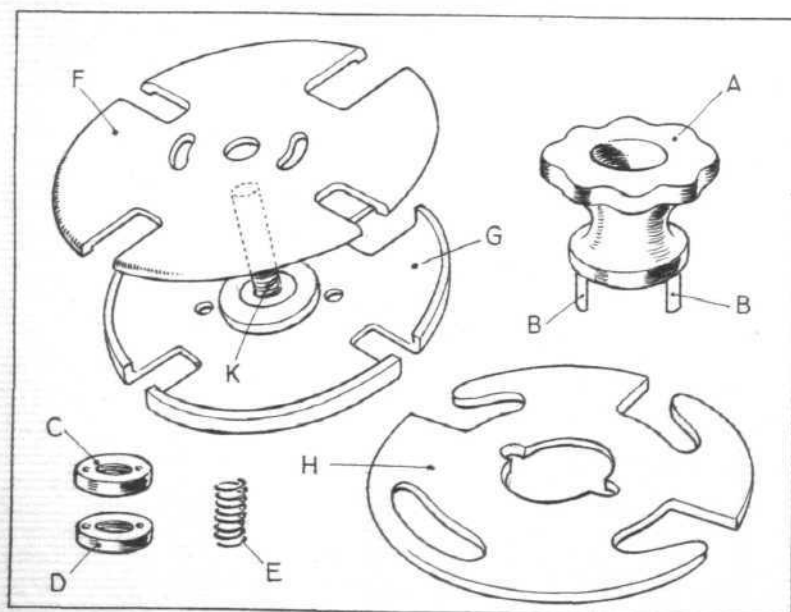
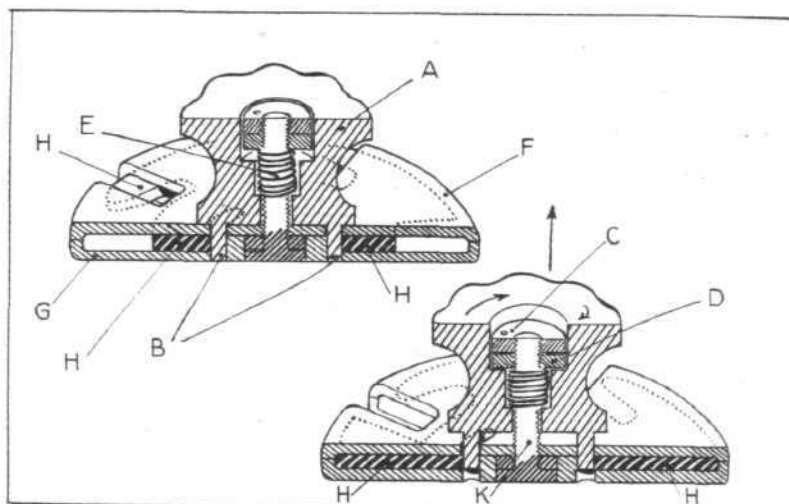
They recommend that training schools, as distinct from flying clubs, should be subsidised on a similar basis, namely, by a fixed payment per pilot for a certain period.

It is further urged that organisations operating Air Ports and Aerodromes should be encouraged by financial means and otherwise, both direct and through Municipalities.

It will be appreciated that these forms of air enterprise are making an important contribution to the development of civil aviation and are also of great value to national industry.

It is not thought that a large outlay of public funds would be involved if subsidies were granted on these lines, and it seems only fair that all such enterprises, in their various categories, should be placed on the same basis so far as State assistance is concerned.

LAST week we announced that Lord Wakefield had presented this Loving Cup to The Guild of Air Pilots and Air Navigators of The British Empire. This announcement was an error for which we wish to apologise. The Cup was in fact presented by Mr. Alexander Duckham, and was in no way connected with Lord Wakefield. Through the courtesy of Mr. Duckham, the Guild were able to show M. Bleriot's historic film on January 8.



**FILLING A LONG FELT WANT:** Above we are able to give full details of the latest quick-release which the Russell Lobe Parachute Co. have designed particularly with a view to its use when landing in the water. Its action is entirely positive.





# TEN YEARS' GLIDING AND SOARING IN GERMANY

By PROFESSOR DR. WALTER GEORGII of Darmstadt

*A lecture delivered before the Royal Aeronautical Society on Wednesday, February 19, 1930.*

(Concluded from page 261)

**I**N this way the successive steps in the development of a new type are carried, with minimum of cost and danger, to a point where the design of the full-sized aeroplane offers no serious uncertainties.

The tailless "Storch" (Stork) was developed on these lines.

Fitted with an 8 h.p. engine, it attained a speed of 125 km./hr., and attracted much attention at the Tempelhof Flying Ground by its speed, manœuvring and great stability, and gave impressive evidence in favour of this type of design.

The question remains whether gliding is a sound basis for piloting a power aeroplane. Opinion is divided, but it may be taken that gliding is a sound basis for further training, and soon tests the balance, touch and eye. But a pupil who has mastered every branch of gliding still requires comprehensive further training when he goes on to power aeroplane piloting. Of far more importance than the preliminary training in hand and eye, is the extension of piloting experience to the special lore of the currents of the air, gathered in far richer measure during a flight of 100 km. from hill to hill and from cloud to cloud, than in year-long flying on power aircraft. Such experiences will give a new generation of flying men a mass of weather wisdom by which they may safely meet and even turn to useful purpose the atmospheric disturbances so frequently met with in air transport to-day. Pilots of this school will imitate the exploits of Kronfeld, and so far from fearing wind and weather will master them and ride the storm front in their flights across the land. The true meaning of "air sense" lies in this conquest of the variable atmosphere by the soaring pilot. Just as the master of a great liner must serve an apprenticeship in sail craft to learn the secret of sea and wind, so should the air transport pilot practise soaring flights to gain wider knowledge of air currents, to avoid their dangers and adapt them to his service.

In confirmation of this view, pilots with soaring experience have shown their special worth in the difficult Lufthansa service across the Alps.

It has not been possible within the limits of this paper to describe more fully the growth of soaring flight, its present activities, its new problems and its future scope. I would call in aid all civilised nations, and particularly your own,

in advancing its achievements to a higher level and opening to its activities all regions of the earth, temperate and tropical.

May I conclude with the hope that the unusual combination of scientific and sporting interest will bring you to join us, in friendly rivalry, in opening the regions of the air to man by means of soaring flight.

## THE FLYING SCHOOL AT THE WASSERKUPPE

By FRITZ STAMER

THE site of the Flying School was selected on a gentle eastward slope about midway between the southern slope of the "Wasserkuppe" and the western slope of the "Weltensegler," a ridge running at right angles to the former, the slopes of which are most used for training glides.

The beginners' course includes pupils holding only the A certificate for glider pilots. Pupils who have passed the B glider test or who hold full pilots' certificates are classed as advanced.

In a session of seven months from 200 to 250 pupils pass through the course, and 15 gliders of five different types are in constant use:—

- 6 of Zögling type for beginners.
- 3 of Prüfling type for soaring practice.
- 2 of Hangwind for soaring in light winds.
- 2 of Canossa two-seaters for soaring.
- 2 of Professor type for high performance soaring flights.

15 total.

In the past year, out of 269 pupils, 139 passed the A test, 121 the B test, and 30 the C test. A course lasts for four weeks and concludes with the B test for pupils of moderate skill. Approved pupils then take the advanced course of four weeks' further training for the C test and for all types.

Solo piloting only is taught in all German gliding schools. The instructor explains the conditions of steady flight and the effects of the controls, warns the pupil against common mistakes, such as stalling and abrupt movements of the controls, and advises him to hold the control firmly centred and without movement during the first glide. The glider in use for this stage was designed from years of experience with a special view to avoidance of accidents, and cannot soar. It is towed over level ground for a short distance and is released when it reaches a limited height. In this way the pupil practises hops without much danger, even in a stalled landing, until he ceases to make false movements and can hold a steady glide. Solo instruction makes the pupil rely on himself from the beginning, while the presence of the instructor might give a false impression of competence. As the initial hops just clear the ground by a few centimetres, the instructor, from the ground, can observe the pupil closely and estimate his progress accurately.

Instruction with dual control has been carried out with success, especially in clubs with a small number of pupils, for which it has certain advantages. But the greater complication of the dual control glider, and the greater calls on the instructor's time, prevent its adoption in schools. When a more suitable two-seater design has been evolved, dual control may become more important. At present a two-seater glider having a low wing loading and a good gliding angle must have an undesirably large span and inertia.

In the Wasserkuppe district the best slopes for gliding practice face from S.E. by S. to N.W., while the prevailing winds are westerly. The slopes facing N. and E. are also good, so that the general lie of the ground is almost ideal.

For training and practice grounds there should be no ground obstructions within the gliding range, as beginners may lose direction or height at any moment, and the ground should have a fairly soft surface such as loose sand, moss, or slightly marshy soil, to mitigate bad landings.

For soaring flight by experts good starting and landing places within the range of flight are the only local ground requirements, and general suitability is judged by the prevalence of rising winds over a considerable area, such as a fairly long ridge, along which the pilot can soar to and fro without frequent turns, which are tiring and lose height. A horse-shoe ridge facing the wind and catching it as in a



A RECORD FLIGHT: The 150 km. flight of Kronfeld from the Wasserkuppe to Bayreuth, August 1929.

funnel sets up strong rising currents and offers good turning points at the ends.

To return to the early stages of training, there should be a choice of courses offering progressive difficulties. A slope with an angle equal to the gliding angle enables the pupil to glide for a hundred metres or more while a false manoeuvre forces him to alight before his glider has time to assume a dangerous position. (In general, of course, flying near the ground is not specially safe.)



UTILISING SAND DUNES: The gliding ground at Rossitten.

As the pupil satisfies the instructor, he is taken by slow stages farther up the slope until he is able to pass the A test—a flight of at least 30 seconds in a given direction to a fixed landing point. From half-way up the slope he is able to practise turns, and proceeds by further stages until he gains the necessary confidence and skill to take from the higher slope the B test—a flight of at least 60 seconds, with right and left turns round given marks, to a fixed landing point. Twenty or thirty flights on the Zögling type are sufficient for the A and B tests. Towards the end of the four weeks' course he pupil is transferred to the "Prüfling" and "Hangwind."

Pilots in the advanced class have usually had preliminary training at a flying school, and begin at once on high performance machines, making long flat figures of eight turns in a region of rising wind, and developing thereby the soaring sense. After a further twenty or thirty flights—forty or fifty flights in all—the pupil takes the C test, which requires a flight of at least five minutes with continuous gain of height, altitudes of 200 m. to 300 m. above the starting point being not uncommon. The course is concluded by instruction on a high performance glider in which the C test is again passed.

There are, each year, one or two courses in long-distance flights and in cloud flying for pilots holding the C certificate.

**Starting.**—The method of starting evolved by years of experience is as follows:—A rubber cable is passed through the ring hooked on to a hook attached to the glider. Two members of the starting party hold the ends of the cable and others hold the tail of the glider. The former walk forward till the slack is taken in. On a signal they run until the length is doubled, where, on a second signal, the tail is released, the glider slides forward, and gains speed till flying speed is reached. At the same time the tension in the cable decreases to nothing, the ring drops from the hook, and the glider is in free flight.

The flight is timed from the instant that the ring drops. The start resembles, closely, the start of an engine-driven aeroplane against a wind.

**Instruments.**—No instruments are fitted to gliders for elementary instruction, and the pupils thereby develop an air sense. On long-distance soaring flights, a light compass is essential to determine the direction of path and wind. The air speed is determined by pitot tube, the scale being calibrated in metres/sec. High performance machines carry a sensitive barograph, giving the change in height to the nearest metre. Sealed barographs are carried in competition flights and in attempts on records. In research flights pressure gauges and inclinometers are fitted, and meteorographs are carried for recording air conditions. The course includes

lectures, and in unfavourable weather the pupils assist in the workshops in building and repairing gliders, which gives them experience in design and construction.

**Objects.**—The objects of the school are to give sporting facilities to keen young men at small cost, and thus to promote formation of private gliding and soaring clubs in Germany, to give training during vacation to academic aviation groups formed of students of aeronautics, and to give theoretical and practical experience to professional pilots of engine-driven aeroplanes.

## THE DISCUSSION

On Friday, February 21, the Royal Aeronautical Society held an informal dinner at the St. Ermins Hotel, Westminster. The Guests of the evening were Dr. Georgii and Herr Stamer, and the idea of the dinner was to give those who had wished to raise questions at the previous lecture, but who had been prevented by lack of time from doing so, a chance to take part in a discussion on gliders. Col. the Master of Sempill opened the discussion by referring to the excellent attendance at the lecture and to the keenness which had been shown on all sides in connection with the revival of gliding in this country. He said that the dinner was a joint one in conjunction with the Royal Meteorological Society, and he was to welcome Dr. Lempfert, Sir Gilbert Walker and Dr. Simpson of that august body. The sport of gliding, he said, was rapidly again arousing the enthusiasm of the younger generation, and would go far toward making aviation better known to all.

DR. LEMPFERT then, speaking in German, thanked Dr. Georgii and Herr Stamer for all the trouble they had gone to in coming to this country to deliver their lectures. Reverting to English, he then went on to point out that gliders have made very good use of cumulus clouds with the upward air currents which are known to exist under and in them, and also of the ascending currents which occur in front of line squalls. The way which these latter had been invested in Germany was particularly interesting, as line squalls had hitherto been looked upon as a source of danger. Dr. Georgii, he said, had stressed the bringing together of sport and science which gliding had effected, and this was particularly so with regard to aviation and meteorology, and these two must continue to help each other through the common interest of gliding. He felt that we had been paid a great compliment by Dr. Georgii and Herr Stamer, in that they had come all this way to give us the benefit of their very vast knowledge on the subject, and he therefore asked all present to drink their health.

The meeting was then thrown open for discussion.

WING-COMMDR. G. F. PRETYMAN asked whether the older pioneers who flew under-powered light aircraft would find that they would quickly be able to learn to handle gliders, and if so how long it would take them to reach a height of 6,000 ft.

DR. LACHMANN, who acted as interpreter for Herr Stamer, replied that such a pilot should make a reasonable gliding pilot in about five flights. The time he would take to get to 6,000 ft. would depend on the weather and the amount of study he had put in on ascending currents in the district he was gliding in, to achieve such a height he would have to fly with his head as much as with his hands.

MAJOR ALAN GOODFELLOW, speaking on behalf of the Lancashire Aero Club, said that they were forming a gliding section, and were placing an order in Germany for a glider, and would like to know whether they should get one of the Zögling or Prüfling type; he asked if it was necessary that the pilot be exposed as in the Zögling, or whether the enclosed cockpit in the Prüfling made it more suitable for pilots used to power-driven aircraft. It seemed to them that the Prüfling would be much simpler for transport, as the wing could easily be unshipped from the fuselage whereas with the Zögling there would be a lot of re-rigging to do every time the machine was transported.

HERR STAMER replied—through DR. SCHERPENBERG—that the Prüfling would be the better for trained pilots, and that it was undoubtedly simpler for transport. The idea of the open seat on the Zögling was so that the instructor could see the actions of the pupil easily.

CAPT. G. T. R. HILL asked what were the means used to measure the rate of vertical descent, and also to measure the angle of glide which he had seen stated as 1 in 28 for some gliders.

DR. LEMPFERT, as interpreter for DR. GEORGII, said



that a very sensitive barogram was used, the reading of which when compared to the known rate of descent in still air gave the desired result.

MR. P. ADJORDAN said that the City and Guilds Engineering College were forming a gliding club, and they would like to know how cheap it was possible to build a glider with volunteer labour, the fees for students at the Wasserkuppe School, and whether it was possible to send anyone to the forthcoming Conference on Gliding at Darmstadt.

DR. LACHMANN (for HERR STAMER) said that the cost of building a glider of the Zögling type was about £15,

sufficient help from the onlookers for a launching crew, and he found the hand-launching method the best, as it was much more sensitive. Gliders can be spun, and it has happened inadvertently in clouds, the landing speed was about 20 km.p.h. for the Zögling type.

Sqd.-LDR. DE H. HAIG asked whether such an instrument as a statoscope had been tried.

DR. GEORGII, through DR. LEMPFERT, said, in reply, that it had not been tried, as they did not think it was sufficiently sensitive. What they used was a variometer, and Kronfeld, on his great flights, had found this satisfactory.



**THE MARGARETE:** A glider of the intermediate type being flown by the flying section of the Technical High School at Darmstadt. They gained the first prize for the two-seater class in the Rhön Gliding Competition.

the Prüfling type somewhat more than this, and the Professor type about £75. These could be bought at a cost of about £60 for the Zögling, £75 for the Prüfling, and £150-£250 for the Professor. The fees for students at the Wasserkuppe are approximately £12 10s. for the four weeks' course for those who have no private income and £15 for those who have. This includes lodging, while board costs about 3s. per day extra. Dr. Georgii expressed the hope that some of the students would go over to the Conference, and said that he would endeavour to get cheap quarters for them, and also he hoped to get free tickets on the Luft Hansa.

SIR GILBERT WALKER explained how when he was in India he had watched the vultures who opened their wing-tip feathers, much in the same way as the Handley Page slot opens, when they were gliding near their stalling speed, and he would like to know whether it was considered that slots would be of any use in gliders. He also asked whether the turbulence of the air could be used for dynamical flying.

DR. LACHMANN (for DR. GEORGII), in reply, said that there was a very large club of slotted wing members of which Mr. Handley Page was but a very junior member! He said that slots were not used on gliders as they were somewhat afraid of the centrifugal forces which would be set up on the wings of high-aspect ratio commonly used in gliders. However, he sincerely hoped that they would be used, and he felt sure that they would be of very great use not only to the gliding experts, but also to Handley Page, Ltd. The turbulence of the air has been used for getting off and for raising the ceiling of power-driven machines.

MR. ASHWELL-COOKE, of the London Gliding Club, said that they were ordering two German gliders, and he would like to know whether automatic launching gear had been tried, as it would sometimes be difficult to get the necessary crew for hand launching; he also asked whether gliders spun easily or whether they had to be deliberately put into a spin, and, lastly, he would like to ask the landing speed of the gliders generally in use.

DR. LACHMANN, replying for HERR STAMER, said that as a general rule they found no difficulty in getting

It should be very useful if some recording mechanism could be used with it. At present they chiefly used a very sensitive altimeter, which registered 10 m. changes in altitude.

COL. SEMPILL then intimated that, as the time was going rapidly, and as it was already very late, further questions would not be answered at the discussion, but if those who had them would now ask them they would be noted and answered subsequently in writing, which was then done.

DR. LEMPFERT then thanked the lecturers for their kindness in coming to this country to lecture, and said that he felt sure that they had all learnt a very great deal from the interesting discussion, as well as from the lecture itself.

DR. GEORGII, in reply, said that he was very sorry that he could not reply in English with the same degree of fluency that Dr. Lempfert had spoken in German. He said that he thanked everyone from the depths of his heart, both for himself and for Herr Stamer, for the way they both had been treated, and he would go away from London with such a store of new impressions and pleasant memories, that would last him a life-time, and he could not thank everyone enough for all they had done. When going round with Col. Sempill he had been glad to see that some of the sites in the Chiltern Hills were very good indeed, and he hoped that before very long the sport of gliding would grow in England, and that we should be able to work together with Germany for the betterment of sport and science.

MR. HANDLEY PAGE said, in conclusion, that the Aeronautical Society had greatly distinguished itself by its linguistic abilities, and bid fair to rival the Berlitz organisation. He said he welcomed gliding, as it would allow people to enjoy the air without having the Air Ministry Police sitting on their tails all the time telling them what they might and might not do. He then became personal, and dilated on whom he had seen at the lecture, and regretted the fact that so many who had no direct connection with the aircraft industry had seen fit to leave early, especially the secretary of the body which governs the sporting side of flying. He was, however, glad to see that Major Buchanan, of the Air Ministry was still there, as, after all, they were only too ready to seek Air Ministry help when they were in trouble.

# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

REPORT of the meeting of the Committee held at the Royal Aero Club, 3, Clifford Street, W.1, on Wednesday, February 26, 1930, at 5 p.m.

**Present:**—Lieut.-Col. M. O'Gorman, C.B., in the chair; Capt. H. S. Broad; Maj. C. J. W. Darwin; A. H. Downes-Shaw; Maj. A. R. Goodfellow; Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.; Col. F. Lindsay Lloyd, C.M.G., C.B.E.; Lieut.-Col. Sir Francis McClean, A.F.C.; F. Handley Page, C.B.E.; Maj. H. A. Petre, D.S.O., M.C.; Capt. C. B. Wilson, M.C.

**In Attendance.**—H. E. Perrin, Secretary; B. Stevenson, Assistant Secretary.

**Election of Members.**—The following members were elected:—John Raymond Ashwell-Cooke; Capt. Robert George Cazalet; Lieut.-Com. Charles Neville Colson; William Lindsay Everard, M.P.; Reginald Henry Lemon; Capt. Ian Constable-Maxwell; Hon. Arthur Frederick Daubeney-de-Moleyns; Peter James Booth Reynolds; Errington Ross, jnr.; John Hugh Saffery; Capt. Charles Ludovic Scott; Leslie Alfred Sellers; Charles John Sharles; Col. Sydney Ernest Smith, C.B.E.; Oliver John Tapper; James Christian Victor Kiero Watson; John Cecil Weale; Roland Cecil Winn; Lieut.-Col. Warwick Wright, D.S.O.; Philip Grantram Yorke.

## Aviators' Certificates.—

8951	Ronald Lees Unwin..	Cinque Ports F. C.
8952	Anthony Frederick Herbert Gee .. .. .	Airwork Sch. of Fl.
8953	Robert Vernon Martin King	Newcastle-upon-Tyne A.C.
8954	Reginald Arthur Neale Shutte	Hampshire A.C.
8955	Walter John Wedd ..	Cambridge A.C.
8956	John Leslie Hutchinson ..	Norfolk & Norwich A.C.
8957	Thomas Arthur Bowring ..	Cinque Ports F.C.
8958	Arnold Louis Christian ..	Newcastle-upon-Tyne A.C.
8959	Donald Charles Blake ..	Lancashire A.C.
8960	Margaret Stevenson ..	Newcastle-upon-Tyne A.C.
8961	Vashon, James Wheeler ..	National Fl. Services.
8962	Samuel Peregrine Tyzack ..	Brooklands Sch. of Fl.
8963	James Brian Buckley ..	National Fl. Services.
8964	Hon. William Drogo Sturges Montagu	National Fl. Services.
8965	John Clayton Cockburn ..	Hampshire A.C.
8966	Marc A. Winandy ..	Yorkshire A.C.
8967	Michael Gordon Rimington	Hampshire A.C.
8968	Ronald Herbert Wright ..	Norfolk and Norwich A.C.
8969	Ian Hugh Trevor Baldwin..	Yorkshire A.C.
8970	Charles Ian Marr Johnson ..	National Fl. Services.
8971	Rupert Redvers Brickwood	Hampshire A.C.
8972	Neville Rhodes Armitage ..	National Fl. Services.
8973	Alexander Blackley Goble ..	Cinque Ports F.C.
8974	Bernard Laurence Hieatt ..	Phillips and Powis Sch. of Fl.
8975	William Davis Lee ..	Liverpool and District A.C.
8976	Violet Perry ..	Berks Bucks and Oxon A.C.
8977	Stanley Louis Buckle ..	Berks Bucks and Oxon A.C.
8978	Joseph Shoesmith ..	Lancashire Sch. of Av.
8979	Charles Robert Douglas Gray	National Fl. Services.

**King's Cup Air Race.**—The recommendation of the Racing Committee that the race should be confined to one day only, viz., Saturday, July 5, 1930, over a course of approximately 750 miles, was confirmed. The approval of His Majesty the King to the regulations for this year's race was reported. It was reported that Lord Wakefield had again offered prizes amounting to £500 for the race.

**The Associated Light Aeroplane Clubs' General Council.**—The report of the meeting of the General Council held on February 6 was adopted.

**British Gliding Association.**—The following sub-committee was appointed to confer with the representatives of the British Gliding Association:—Lieut.-Col. M. O'Gorman, C.B.; Capt. H. S. Broad; Maj. H. A. Petre, D.S.O., M.C.

The qualifications laid down by the Fédération Aéronautique Internationale for certificates for persons flying gliders were considered. It was decided that they should be known as "Gliding Certificates."

**Air Ministry "A" Licences.**—The Committee received the report of the Conference with the Air Ministry, held on January 30, 1930, at which recommendations were made for alterations in the present tests for "A" licences, both as regards issue of new licences and renewal. The recommendations would be put forward by the Air Ministry to the next meeting of the International Commission for Air Navigation. The Club was represented at the conference by Maj. A. R. Goodfellow and H. E. Perrin.

## ANNUAL GENERAL MEETING

The Annual General Meeting of the members will be held at 3, Clifford Street, on Wednesday, March 26, 1930, at 8.30 p.m. Notices of motion, signed by at least five members, must be received not less than 21 days before the meeting.

**Election of Committee.**—In accordance with the rules, the committee shall consist of 18 members. Members are elected to serve for two years, half the committee retiring annually. Retiring members are eligible for re-election. The retiring members of the committee are:—Air Vice-Marshal Sir W. Sefton Brancker, K.C.B., A.F.C., Captain H. S. Broad, Major C. J. W. Darwin, A. H. Downes-Shaw, Major A. R. Goodfellow, Colonel F. Lindsay Lloyd, C.M.G., C.B.E., Lieut.-Col. J. T. C. Moore-Brabazon, M.C., Lieut.-Col. M. O'Gorman, C.B., Major H. A. Petre, D.S.O., M.C.

Any two members of the club may nominate a member to serve on the committee, provided the consent of the member has been previously obtained. The name of the member thus nominated with the name of his proposer and seconder, must be received not less than 14 days before the annual general meeting. March 12 is the latest date on which nominations can be received.

The following members have so far been nominated for the nine vacancies:—Captain H. E. P. D. Acland, Air Vice-Marshal Sir W. S. Brancker, K.C.B., A.F.C., Captain H. S. Broad, Major A. Q. Cooper, D.S.C., A.F.C., Major C. J. W. Darwin, A. H. Downes-Shaw, G. G. H. du Boulay, Major A. R. Goodfellow, Colonel F. Lindsay Lloyd, C.M.G., C.B.E., John Lord, Squadron-Leader R. L. G. Marix, D.S.O., Lieut.-Col. J. T. C. Moore-Brabazon, M.C., Lieut.-Col. M. O'Gorman, C.B., Major H. A. Petre, D.S.O., M.C., R. L. Preston, Air Commodore C. R. Samson, C.M.G., D.S.O.

Offices: THE ROYAL AERO CLUB

3, CLIFFORD STREET, LONDON, W.1.

H. E. PERRIN, Secretary

## "The Inventor"

INVENTORS—at least some—often find the path of inventing a by no means rosy one, and there are those who have the "idea" but fail, or do not know how, to put it to a successful or profitable conclusion. Not only is the question of patents a very big one, but there is also the important matter of whether the "idea" or invention is practicable or already has "been weighed in the balance and found wanting."

Therefore it seems to us that "The Inventor," a monthly journal (the official organ of the Institute of Patents) devoted to the interests of the inventor and others should serve a very useful purpose indeed. Apart from this, however, it is an extremely interesting publication containing many valuable features, and is well worth inspection by those of an inventive turn of mind. It is published (price 6d.) by the St. Albans Press Agency, 1, Featherstone Buildings, High Holborn, W.C.1.





# AIR TRANSPORT

## QANTAS FLIES A MILLION MILES

**W**ITH its sixtieth monthly issue, dated January, 1930, the *Qantas Gazette* appears in a new and very pleasing form, being printed in silver and red on a white background. Very appropriately, this issue celebrates the completion of 1,000,000 miles flown by this enterprising and well-managed company. In reflective mood, the *Gazette* reminds us that without the steam locomotive the federation of the Australian States would have been impossible; the motor car has recently opened up the "back of the railway"; while the aeroplane is destined to draw the far-scattered Commonwealth together for all purposes of unity.

The statistics for the month show 222 passengers carried on the regular routes, counting by stages; while there were 27 taxi passengers. The freight carried was 2,162 lbs., and the miles flown in the month amounted to 23,247.

The mileage would doubtless have been greater but for an outbreak of healthiness in Cloncurry district. The flying doctor and the ambulance aeroplane made fewer trips than usual. Nevertheless, it is pointed out, the knowledge that the doctor is there and can come on flying wings to a case gives a feeling of comfort and security to all the settlers in the out-of-the-way tracts of the district. One ambulance

trip is put on record. During the New Year's race meeting at Millungera, 100 miles from Cloncurry, a rider was thrown and dislocated his shoulder. Local attempts to get the joint into place were not successful, and the man was in great pain. So the missionary doctor was sent for, and, of course, the 100-mile trip only took him about an hour. One can imagine what the patient would have suffered if the 100 miles had had to be covered by ground transport.

The use of Qantas aeroplanes by wool-buyers is an important side of the company's activities. Wool buyers are always men in a hurry. They come up from Sydney to Brisbane to expedite the delivery of the wool from warehouse to ship's side, following on wool sales in Brisbane. Over 11,500 miles have now been flown on these trips, and it has been found that the use of the aeroplane in preference to sending long code telegrams has actually resulted in a saving of money.

In addition, it often happens that ships now can load wool and clear port a day earlier than formerly. In fact, the energies of Qantas are manifold, and the success of their operations is a thing of which the whole Empire may well feel proud.

## SOUTH AFRICA

**I**N the Union of South Africa the year's report on civil flying is issued by the Postmaster-General. The report for the year 1928-29 has recently been issued, and it shows that air services are now definitely recognised as a factor in the distribution of mails. Compared with the previous year there were 21 more civil aircraft, 44 more pilots, 13 more ground engineers, and 11 more aerodromes. The aircraft flew about 271,700 miles and carried 9,158 passengers. The nine flying clubs had a membership of 1,200. Three companies were carrying out pleasure flying, photography, and miscellaneous flying. The report records the agreement between the Government and Union Airways, Ltd. for three years, with a subsidy of £8,000 per annum, for an air service between Capetown and Port Elizabeth, with two extensions from the latter town to Durban and Johannesburg, respectively. It also records that the Union Government will contribute £400,000, spread over five years,

to the Cape to Cairo air service. During the year there were four fatal accidents, which caused seven deaths. The difficulties which have to be overcome are stated to be:— (1) Lack of facilities for flying training in the country districts; (2) shortage of landing grounds and ground organization; and (3) lack of public confidence in air transport. These, however, are being tackled in the proper spirit.

In January last an agreement was signed between the Union Government and the municipality of Victoria West which arranges for a public aerodrome to be established at that town for the use of Imperial Airways machines flying on the trans-Africa service.

On January 24 Major Miller tested the first of the Fokker machines which he has ordered for his Union Airways service now that the traffic has outgrown the Moths with which the service was opened. The machine is a six-seater, with a 425 h.p. engine.

### Canadian Air Mail Services

THE High Commissioner of Canada in London is advised by the Postmaster-General at Ottawa that it has been decided in future to operate the experimental air mail service between Montreal, Quebec, Moncton and St. John (N.B.) in two stages. The first route taken will be between Montreal, St. John and Moncton and return, and the second between Montreal and Quebec and return. A regular daily air mail service for Western Canada was inaugurated on March 3, between Winnipeg, Regina, Saskatoon, Calgary, and Edmonton. In Winnipeg the occasion was marked by the lighting for the first time of a beacon light erected by the Hudson's Bay Company.

### Adelaide-Melbourne Air Service

A REGULAR tri-weekly air service between Adelaide and Melbourne will be opened this month by Australian Aerial Services, Ltd.

### Southern Railway and Air Services

SPEAKING at the annual meeting of S.R. shareholders, on February 27, the Chairman, the Hon. E. Baring, said:—

"We have arrived at an understanding with Imperial Airways, as we are entitled to do in accordance with the powers we obtained last year. The companies mutually recognise each other's natural desire to develop their own services, and they agree to be mutually helpful in through bookings, display of literature and similar matter. The Southern Railway have acquired a shareholding interest, but not a controlling interest, in Imperial Airways, and have

agreed that should they wish to run air services under the air powers mentioned, such air services will be operated by Imperial Airways."

### Civil Flying in Switzerland

THE statistics of civil flying in Switzerland in 1929 have now been published, and they show a gratifying advance on the figures for 1928. In the flying schools the number of flights rose from 6,442 to 11,860. Pleasure flights, taxi flights, photographic flights, and flights by private aeroplanes rose in number from 4,651 to 7,419, and the number of passengers carried rose from 6,451 to 13,373. On commercial air lines, Swiss and foreign, which fly over Swiss territory, the number of flights in the year was 28,062; the hours flown, 14,810; the kilometres covered, 1,967,080; passengers carried, 42,050; mail matter, 102,950 kilograms; freight, 334,390 kilograms; and luggage paid for, 48,220 kilograms. All these figures show a substantial rise on the 1928 figures.

### Batavia-Singapore Service Opened

ON March 4 the weekly air service between Batavia and Singapore—to which we have referred previously—was inaugurated by a flight to Singapore. A three-engined Fokker was employed, carrying a full complement of passengers, including the Governor-General of the Dutch East Indies.

### London-Barcelona and Genoa Service

THE Air Union Company of France will shortly inaugurate a new long-distance air service to Barcelona and Genoa, bringing these two cities within 10½ hours flight of London.

# AIRISMS FROM THE FOUR WINDS

## The Prince in Kenya

THE Prince of Wales has made further flights over the jungle in the Masai Reserve in a D.H. "Moth," piloted by Mr. Campbell Black. Unfortunately, His Royal Highness had to cut short his hunt owing to an attack of subtertian malaria. He is, however, making a speedy recovery.

## Mr. Van Lar Black

MR. VAN LAR BLACK, who left Croydon on February 8 in a three-engined Fokker for an aerial tour in the East, reached Karachi on March 2. His progress, so far, has been as follows:—Marseilles (stayed two days), Seville (stayed two days), Tangier (found aerodrome flooded, so returned to Seville), Algiers (stayed two days), Kairouan (stayed the night to witness a special Dervish dance), Tripoli (stayed two days), Cairo (stayed a week sight-seeing, visiting Gaza, Jerusalem, etc.), Baghdad, Karachi. He left Karachi on February 5 for Delhi.

## Coastal Relief Stations in Italy

A REPORT from Rome states that a plan has been formulated by the Ministry of Communications, and will soon be put into operation, whereby relief stations will be organised at various points on the Italian coast to assist in case of accidents or forced landings of aircraft. These stations will be situated close to wireless stations, from which ships specially equipped for the rescue of passengers and machines will be sent out even in the roughest weather. The ten stations will be at Spezia, La Maddalena, Naples, Messina, Taranto,

Brindisi, Venice, Trik el Gefara (Tripoli), Sidi Kalifa (Tripoli) and the Island of Rhodes.

## Airships and Foremen Engineers

LIEUT.-COL. V. C. RICHMOND and Maj. G. H. Scott were guests at the dinner of the London Association of Foremen Engineers at Cannon Street Hotel on Saturday, March 1. Replying to the toast of "The Guests," Col. Richmond said that airship design had not yet reached perfection and many improvements were being carried out. Maj. Scott mentioned that Great Britain owned 62 per cent. of the airship tonnage now flying.

## Air Surveys in East Africa

REPLYING to a memorandum drawn up by the East African and Civil Aviation branch of the London Chamber of Commerce (see FLIGHT, December 13, 1929, p. 1301), Lord Passfield, the Secretary of State for the Colonies, stated that the subject of air surveys in the Colonies was at present receiving his careful consideration, and that the special needs of Tanganyika Territory would be taken into account in the formulation of a policy on this subject.

## A Canadian N.F.S.

MAJ.-GEN. J. H. MACBRIEN, president of the Aviation League of Canada, has made proposals for an amalgamation of the smaller operating companies and flying clubs throughout the Dominion into an organisation to be known as National Flying Services of Canada, Ltd., and calling for a 5-year subsidy from the Government.

## Belgian Air Minister Visits England

M. LIPPENS, the Belgian Air Minister, accompanied by his daughter, who is a licensed pilot, arrived by air at Croydon from Belgium on February 28 on a private visit to England.

## To the Races by Air

A SERVICE of multi-engined Handley-Page air liners between London and the big provincial race meetings is to be inaugurated by Imperial Airways. The service will begin with the Grand National on March 28.

## Seaplane and Boat Collide

AN ITALIAN seaplane descending in Phalerum Bay, Greece, struck a boat which capsized, and four of its nine passengers were drowned.

## The Right Enterprise

MISS AMY JOHNSON, of the London Aeroplane Club, Stag Lane, Edgware, is planning to make a flight to Australia early this year in order that England may have the honour of seeing one of her countrywomen being the first woman to make this flight, and so follow up the wonderful flights which have already been made by English women.

She is naturally desirous that her machine should be an English one, but so far has been unable to get in touch with anyone who is able to assist her in this matter, and therefore, to avoid the necessity of her having to accept the offer of help from a foreign aircraft manufacturer she would be very glad to hear, at the above address, from anyone who is interested in her project.

Miss Johnson has already shown her keenness and enterprise by becoming the first woman holder of an Air Ministry "A" Ground Engineer's Licence and is now studying for her "B" licence, she also holds her "A" pilot's licence.

## Imperial Defence College. Appointment of Commandant

THE Air Ministry announces:—Air Vice-Marshal Sir R. Brooke-Popham, K.C.B., C.M.G., D.S.O., A.F.C., Royal Air Force, at present in command of the Royal Air Force in Iraq, has been selected for appointment as Commandant of the Imperial Defence College, in succession to Major-General W. H. Bartholomew, C.B., C.M.G., the present Commandant, who is due to vacate the appointment at the end of December, 1930.

The appointment is at present for a period of two years, and is filled by each of the services in turn.

No announcement has yet been made of the name of the next A.O.C. in Iraq.

Air Vice-Marshal Sir Robert Brooke-Popham was appointed to the Royal Flying Corps from the Oxford and Bucks Light Infantry in 1912, and served in France from August, 1914, with short intervals until the end of the war. He was appointed in command of a wing in February, 1915, and was later employed in staff duties at the Royal Flying Corps headquarters. On the formation of Air Defences of Great Britain he was given the command of the Fighting Area, which he brought to a high state of efficiency.

## THE ROYAL AERO CLUB OF THE UNITED KINGDOM

### CERTIFICATE OF PERFORMANCE (UNDER THE COMPETITION RULES OF THE ROYAL AERO CLUB)

### *World's Record* *(Fédération Aéronautique Internationale)* *Class C<sup>1</sup> (Seaplanes)*

Machine - Supermarine-Rolls-Royce S6  
Constructors - Supermarine Aviation Works Ltd  
Engine - Rolls-Royce "R"  
Constructors - Rolls-Royce Ltd  
Pilot - Squadron-Leader A. H. Orlebar, A.F.C.  
Date - 12<sup>th</sup> September 1929  
Place - Southampton Water

### *Performance*

Greatest Speed over Straight Line Course of 3 Kilometres  
575.700 Kilometres (357.7 miles) per hour

*R. H. L. L. L.* Chairman  
*W. H. B. B. B.* Secretary

THE SEAPLANE SPEED RECORD: Above is a reproduction of the Certificate issued by the Royal Aero Club in connection with the World's Speed Record of 357.7 m.p.h. established by Sqdn/Ldr. A. H. Orlebar on the Supermarine-Rolls-Royce S.6. It may be of interest to mention here some brief particulars, just released by the Air Ministry, regarding the Rolls-Royce "R" engine used in the S.6. It develops over 1,900 h.p. and weighs only 1,530 lbs., so that the power weight ratio is less than 1 lb. per h.p., i.e. 805 lbs. This tremendous power, furthermore, is confined within an overall length of 90 inches!



# MODELS

**T**HE first flying meeting of the season (Aero-Modellists) was held on Saturday, March 1, on Wimbledon Common (near the Windmill), when the Model Aircraft Club, including representatives from Duxford, turned up in force for the first of its monthly flying meetings.

Although there was a strong, gusty wind blowing, some excellent flights were accomplished, especially by the larger models. Altogether, about 60 models were in evidence, in a variety of types and sizes. With the exception of one biplane (at least, we only noticed one), all the models were monoplanes, the enclosed tractor fuselage type being in the majority. In fact, the "flying stick" variety was represented by but two or three examples—and one of these gyrated high up in the wind like a Spring lamb in a most amusing fashion.

It should be stated that this was the first time we had attended a big flying demonstration of *modern* model aircraft, and we must admit that we were very favourably impressed by the advance made in the construction, design, and flying



**T.M.A.C. AT WIMBLEDON:** About 60 model aeroplanes, of various types and sizes, were present at The Model Aircraft Club's first meeting of the season last Saturday. Some of these models are shown in the three accompanying illustrations. Mr. Dowsett's petrol-driven monoplane will be seen in the centre of the above picture. (FLIGHT Photos.)



qualities as compared with the models of a few years back. Some of the models functioned splendidly and flew strongly, circling and banking and behaving generally exactly like their larger, full-sized prototypes.

We feel convinced that much may be learnt by studying the flight of such models, which appear to possess most interesting individual and consistent characteristics. Crashes, of course, were frequent—but it is wonderful how the modern model stands up to hard punishment—and occasionally there were stalls, due to strong wind gusts or perhaps

faulty launching, when it was interesting to watch how the model either successfully got over it or else got into a healthy spin with resulting crash.

Talking of faulty launching, it occurred to us that the powers that be in model aircraft clubs might with advantage hold instruction courses in the by no means easy art of launching—issue, in fact, "pilots' certificates" on the passing of certain tests—for we noticed one or two really good flyers making sorry performances, due entirely to faulty launching, etc.

To return to the meeting, however, we wish to mention in conclusion the fine flights by Mr. Newell's "Falcon," and also Mr. Godfrey's and Mr. Tweedie's 'buses. Mr. Dowsett's "Hawk Special" petrol-driven monoplane did not get a fair chance with the high wind—better luck next time!

## THE MODEL AIRCRAFT CLUB (T.M.A.C.)

The Debate arranged for Wednesday, March 19, viz.:—(Mechanical versus Rubber-Driven Models), at the Junior Institution of Engineers, 39, Victoria Street, Westminster, has been postponed until Wednesday, April 16, 1930, by request of the members. In its place another meeting has been arranged. On this occasion six of the most prominent aero-modellists have accepted the invitation to answer questions on matters appertaining to model aeronautics. This has been considered advisable as the Club has so many new members who are anxious to seek first-hand knowledge.

A nominal charge of 6d. will be made to each member to defray expenses.—Hon. Secretary, A. E. JONES, 48, Narcissus Road, West Hampstead, London, N.W.6.

## INTERNATIONAL TOURING COMPETITION

### The Award of Points

**L**AST week we referred, in our Editorial Comment, to the rather vague wording of the regulations governing the International Touring Competition for Light Planes which starts at Berlin on July 20, and pointed out that the basis upon which points for speed and take-off are to be gained was not at all clear in either the French or the German text. We have had no official pronouncement upon the subject, but it is now fairly certain that the answer to the puzzle is as follows: In the speed tests, the regulations state, no points will be awarded for speeds below 90 km./hr. From 91 to 135 km./hr. 3 points per km./hr. will be awarded. From 136 to 155 km./hr. 2 points per km./hr. will be awarded, and from 156 to 175 km./hr. 1 point per km./hr. will be awarded. This is now taken to mean that, as we surmised last week, the intention is that the points are cumulative.

Thus for the first 45 km./hr. over and above 90 the award will be 3 points per km./hr. For the next 20 km./hr. it will be 2 points per km./hr., and for the last 20 km./hr. it will be 1 point per km./hr. In other words, a machine which does an average speed of 175 km./hr. around the circuit of Europe (this being the maximum for which points will be awarded) will receive points as follows:—

$$(135 - 90) 3 + (155 - 135) 2 + (175 - 155) 1$$

$$\text{or } 135 + 40 + 20,$$

which totals the 195 points stipulated as the maximum to be awarded in the speed test. This is, of course, quite a reasonable way to treat the merits of speed, the "encouragement" decreasing as a speed of 175 km./hr. is approached. The competition is intended to encourage the reliable touring machine rather than the very fast machine, and it does not seem necessary, at present at any rate, to aim at cruising speeds of more than 175 km./hr. (108.5 m.p.h.). In fact, a machine which can put up this average without losing too many points in the take-off and landing tests is going to be a very good aeroplane.

In the take-off tests, it would appear, a very similar procedure has been adopted as regards the basis for award of points. In this test, it will be recollected, machines have to take-off from rest from a chosen point less than 400 m.

from an obstacle 8 m. high, and clear the obstacle. The take-off distance upon which the award of points is based will not be the simple geometric distance between the point on the aerodrome where the wheels begin to revolve and the obstacle, but will be this distance increased by the product of the time taken to clear the obstacle and the force of the wind at the time, the time being in seconds and the wind in metres per second.

For example, a machine with a take-off run (actual) of 120 m., which took 30 seconds to clear the obstacle in still air would be logged as having done a take-off run of 120 plus  $30 = 150$ . If a wind were blowing at the time, of 10 m. per second, the run thereby being shortened to 100 m. and the time remaining 30 seconds as before, the machine would be logged for a take-off of  $100 + (10 \times 30)$  or 400, the maximum permitted without disqualification of the machine. It will be seen that, although appearing complicated, this system of awarding points is, in reality, fairly simple, and it is rational in that a strong wind, which will enable competitors to take off in a shorter actual run, will increase the total figure logged, and will thus tend to even matters up. Also, the very fast machine (which may be expected to require a longer run) will have a chance to make up for this shortcoming in some measure because of its greater speed, which will enable it to cover the take-off distance in a shorter time. Altogether, the regulation seems to work out as the sort of rather clever thing which one would expect from a body like the Aero Club of Germany.

The problem of "relativity" in the take-off test is dealt with in the following manner:—The machine with the best take-off distance (defined as above) will be awarded 30 points, and the other competitors will be awarded a lower number of points, according to the following sliding scale: 1 point less for each  $3\frac{1}{2}$  m. from 1 to 30 m., or 9 points less; 1 point less per 5 m. from 30 to 90 m., or 12 points less. And 1 point less for each 10 m. from 90 to 180 m., or 9 points less than the winner. Thus a machine which takes 180 m. more than the best man will receive no marks at all. This fact is important because the best machine in this test may, conceivably, be so good that few others will score any points.

The landing test is practically the take-off test reversed.

## AT BUCKINGHAM PALACE

H.M. THE KING held an investiture at Buckingham Palace on March 4, at which the following were amongst those introduced into the presence of the Sovereign, when the King invested them with the insignia of the respective Divisions of the Orders into which they have been admitted:—

*Order of the British Empire.—Civil Division*  
Dame Commander.—The Hon. Lady BAILEY.

*Royal Victorian Order*  
Member: Fourth Class.—Sgdn.-Ldr. David DON, R.A.F.

*Order of the British Empire.—Military Division*  
Officer.—Sgdn.-Ldr. Harold JAMES, R.A.F.

His Majesty then conferred decorations as follows:—

*Distinguished Flying Cross*  
Flt.-Lieut. Vivian PARKER, R.A.F.

*Air Force Cross*  
Flt.-Lieut. Thomas HARRY, R.A.F.; Flt.-Lieut. Henry WAGHORN, R.A.F.; and Flt.-Lieut. Edward FIELDEN, R.A.F.

*Medal of the British Empire for Gallantry.—Military Division*  
Pilot Officer William McKECHNIE, R.A.F.

On June 20, 1929, an aeroplane piloted by Flight Cadet C. J. Giles crashed on landing at Cranwell Aerodrome and burst into flames. The pilot was

stunned, but managed to release his safety belt and fall out of the machine in a dazed condition. Flight Cadet McKechnie, who had landed in another aeroplane some 200 yards away, left his machine and ran towards the scene of the accident. McKechnie, without hesitation, ran into the flames and pulled out Giles, who was badly burned about the legs and face, with his Sidcot suit and clothes actually burning. After dragging him clear of the flames, during the process of which he was scorched and superficially burned, McKechnie proceeded to extinguish the flames of Giles's burning clothing. By this time the machine was in full blaze, with the petrol spreading along the ground so that, without McKechnie's assistance, there is no doubt Giles would have been burned to death, as he was quite incapable of moving himself.

Pilot Officer Sidney WILTSHIRE, R.A.F.

For conspicuous gallantry displayed at Temple Bruer Landing Ground, Sleaford, on October 21, 1929.

This officer, who is a pilot under instruction, was flying with his instructor, Flying Officer H. E. Power, in an aeroplane that crashed on landing and at once caught fire. Having extricated himself from the wrecked machine, he found that his companion's foot was caught in the wreckage and that he could not get out.

Although fully realizing the risk he was running, Pilot Officer Wiltshire re-entered the flames and helped Flying Officer Power to get clear, during which process he sustained burns on his neck and face. Power's clothing was by this time well alight, and he would undoubtedly have lost his life but for the prompt and courageous action taken by his pupil. As it was, he was badly burnt. Both officers were shortly afterwards taken by air to Cranwell Hospital. The aeroplane was completely burnt out.

Amongst those present were Air Chief-Marshal Sir John Salmond (Principal Air Aide-de-Camp), in attendance upon His Majesty, and Group Captain R. Ross (Aide-de-Camp in Waiting).

### Gordon Shephard Memorial Prize Essay Awards

THE Air Ministry announces: The Gordon Shephard Memorial Prizes, which are given annually for the best essays submitted by members of the Royal Air Force on subjects selected by the Air Council, have been awarded as follows in the 1929 competition:—1st Prize.—Wing-Commander W. A. McClaughry, D.S.O., M.C., D.F.C., p.s.a. 2nd Prize.—Group-Capt. L. W. B. Rees, V.C., O.B.E., M.C., A.F.C. 3rd Prize.—Squadron-Leader H. P. Lloyd, M.C., D.F.C., p.s.a. The

competition was established as a memorial to the late Brigadier-General G. S. Shephard, D.S.O., M.C., Royal Air Force.

### R.38 Memorial Prize

THE R.38 Memorial Prize of the Royal Aeronautical Society has been awarded for 1929 to Miss Hilda M. Lyon, M.A., A.F.R.Ae.S., for her paper entitled "The Strength of Transverse Frames of Rigid Airships." The paper will shortly be published in the R.Ae.S. Journal.



# THE ROYAL AIR FORCE

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the R.A.F. are notified :—

### General Duties Branch

*Wing Commander* H. G. Smart, O.B.E., D.F.C., A.F.C., to No. 99 Sqn., Upper Heyford, to Command : 5.2.30.

*Squadron Leaders* : L. M. Bailey, A.F.C., to R.A.F. Depot, Uxbridge : 7.1.30. L. C. Keeble, to H.Q., Coastal Area : 20.1.30. A. P. Maurice, D.F.C., to Superintendent of R.A.F. Reserve, Hendon : 11.2.30. J. S. T. Fall, D.S.C., A.F.C., to Home Aircraft Depot, Henlow : 10.2.30.

*Flight Lieutenants* : H. N. Hawker, to No. 111 Sqn., Hornchurch : 7.1.30. G. T. Richardson, to Armament and Gunnery School, Eastchurch : 4.2.30. J. N. Boothman, to Marine Aircraft Experimental Estab., Felixstowe : 10.2.30. A. J. Elliott, to No. 22 Group H.Q., S. Farnborough : 10.2.30. H. M. Massey, M.C., to H.Q., Coastal Area : 12.2.30. J. R. Wolley, to School of Army Co-operation, Old Sarum : 1.2.30. J. N. D. Anderson, to R.A.F. Depot, Uxbridge : 30.1.30. M. H. Garnons-Williams, to R.A.F. Depot, Uxbridge : 21.1.30.

*Flying Officers* : H. J. Paine, to R.A.F. Depot, Uxbridge : 10.2.30. G. Wood, to Station Flight, Andover : 29.1.30.

*Pilot Officers* : N. R. G. Hunter, to R.A.F. Depot, Uxbridge : 26.1.30. G. J. C. Paul and F. J. St. G. Braithwaite, to No. 13 Sqn., Netheravon : 12.2.30. H. P. Fraser and R. Harston, to No. 16 Sqn., Old Sarum : 12.2.30. A. F. C. Booth, A. C. Watson and W. M. Rankin, to No. 26 Sqn., Catterick :

12.2.30. E. A. Cooke and E. D. Bishop, to No. 7 Sqn., Worthy Down : 12.2.30. R. C. A. Brooke-Beer, V. R. Moon, and F. R. W. Goad, to No. 9 Sqn., Manston : 12.2.30. G. H. A. Blackwood and T. W. Hoyle, to No. 10 Sqn., Upper Heyford : 12.2.30. G. N. Roberts and L. E. Jarman, to No. 12 Sqn., Andover : 12.2.30. C. S. Gill, T. H. Wilson and P. J. Pratt, to No. 58 Sqn., Worthy Down : 12.2.30. G. E. Mustard, R. A. Davies and G. P. Marvin, to No. 99 Sqn., Upper Heyford : 12.2.30. H. L. Smith, D. W. Smythe, R. E. H. Beaton and G. P. Longfield, to No. 101 Sqn., Andover : 12.2.30. G. S. King, to No. 207 Sqn., Bircham Newton : 12.2.30.

The following Pilot Officers are posted to R.A.F. Depot, Uxbridge, on appointment to Short Service Comms., on probation, with effect from 3.2.30 :—R. V. Alexander, N. H. Bantoft, J. Boston, H. M. Bowes-Lyon, H. F. Clayton-Daubeny, E. J. P. Davy, W. G. Eatherley, T. J. MacInerney, J. G. Mansfield, P. W. E. Ryland, R. M. Smith, J. B. T. Whitehead, B. E. Lowe, and U. Y. Shannon.

### Stores Branch

*Flight Lieutenants* : C. A. Longhurst, to Station H.Q., Kenley : 17.2.30. R. W. Stewart, to No. 4 Stores Depot, Ruislip : 10.2.30.

*Flying Officers* : J. E. Welman, to R.A.F. Depot, Uxbridge : 15.11.29. F. E. R. Dixon, M.C., to No. 600 Sqn., Hendon : 10.2.30. C. L. Thompson, to No. 504 Sqn., Hucknall : 10.2.30. A. Amy, to R.A.F. Depot, Uxbridge : 3.1.30.

## R.A.F. SPORT

### Boxing

#### R.A.F. OFFICERS v. OXFORD UNIVERSITY

The R.A.F. officers defeated Oxford University in a boxing tournament at Henlow, on Friday, February 21, by 18 points to 15. As the officers due to box in the Middle Weight, and second string Light Weight, were absent on the sick list, Oxford agreed to airmen taking their places. Both these airmen won their matches. The results were as follow :—

#### BANTAMWEIGHT

S. Lottenville (St. Caths.) v. P/O. H. G. J. Purcell (Digby). Purcell won on points, and scored several hard head blows in the first round. Lottenville got in a good right lead on the jaw in the second round.

#### FEATHERWEIGHT

C. L. Deveson (Balliol) v. F/O. Watkins (Farnborough). Watkins won on points, and showed up best in the first round. In the second round Deveson got in a straight left which brought Watkins to the ground for a few seconds.

#### LIGHTWEIGHT

M. J. Bessell (St. John's) v. P/O. A. H. Noblston (Netheravon). Bessell was knocked out in the first round, the referee stopping the fight after Bessell had been floored four times.

C. J. Lonsdale (Ch. Ch.) v. A/C. Slattery (Henlow). Lonsdale was knocked out in the first round, Slattery bringing him down on hands and knees three times.

#### WELTERWEIGHT

T. R. F. Cox (University) v. P/O. A. H. Abbott (Netheravon). Cox won on points, scoring well in the first round. Abbott made a good recovery in the third round and stood his ground.

C. W. Rivington (New) v. F/O. G. H. Loughnan (Catterick). Rivington won on points, and scored over his opponent in having a longer reach.

R. Freeman (University) v. P/O. Grant (Digby). An exciting fight, both being well matched. Freeman, who got in several good head blows, won on points.

#### MIDDLEWEIGHT

C. Richardson v. Cpl. J. Wood (Henlow). Wood won on points, getting in a powerful left swing early in the first round. He was punished somewhat severely in the second round, but got in some good head and body swings nevertheless.

#### LIGHT HEAVYWEIGHT

W. P. Thesiger (Magdalen) v. F/O. D. L. MacLean (Henlow). MacLean won on points, and got in several masterly blows with both gloves.

C. Knight (Ch. Ch.) v. P/O. C. R. Davies (Sealand). Knight was knocked out in the second round, in which he was floored twice.

#### HEAVYWEIGHT

Marquis of Graham (Ch. Ch.) v. P/O. G. F. S. Williams (Digby). An even match, in which Williams was beaten on points, although he did well in the first round.

The prizes were afterwards presented by Air Vice-Marshal A. E. Borton, Commanding Inland Area, R.A.F.

### Rugby Football

#### R.A.F. v. OXFORD UNIVERSITY

Oxford beat the R.A.F. at Halton on Wednesday, February 26, by 2 goals (10 points) to 1 try (3 points). Neither side was at anything like full strength. The 'Varsity had none of their three English internationals—Robson, Howard and Black—while the R.A.F. were without Llewellyn, Constantine, Franks and Maxwell, the last named being on leave before going overseas. G. R. Beamish, however, did great work forward, and McKechnie and Kerby were good in the loose. The game was a very good and fast one, in which each side in turn made spirited attacks on the enemy's goal line. On the whole the 'Varsity were the better side, and deserved to win, but the R.A.F. defence was very sound and forced the Dark Blues to go all out to get their scores. The attacks by the R.A.F. lacked that precision and finish which results in tries, and the team still suffers from lack of pace. Odbert was conspicuous for his breaks through the centre, but lack of team work usually brought his efforts to nothing. The centre three-quarters of the R.A.F. were prone to pass too soon, before the defence had been drawn. Oxford attacked from the kick off, but it was nearly a quarter of an hour before King, well supported on both sides, got into a dangerous attacking position. A well-judged pass to Hall produced a try which Henley converted. Then the Air Force rallied and did most of the attacking. Twice White was only just pulled down in time, after openings made by Ievers and Odbert respectively. Soon after the change of ends the Oxford three-quarters line made another well-combined attack, and Mackay scored a second try, which was also converted. Then the Air Force forwards played up splendidly, but Oxford was actually attacking when Odbert broke through. He made a long run and then passed to White, who just got over for an unconverted try. The teams were :—

*Royal Air Force*.—F/O. G. M. Ievers ; P/O. M. White, F/O. J. R. D. Pott, P/O. S. D. Solcum and F/O. R. D. Cotton ; Flight-Lieut. R. V. M. Odbert

and P/O. C. R. A. Emslie ; A.C. I. Gibbs, P/O. Wallace, Sgt. Hall, L./A.C. Fowler, F/O. Beaumont, Flight-Sgt. W. Kerby, Flight-Lieut. G. R. Beamish, and P/O. W. V. McKechnie.

*Oxford University*.—J. A. Adamson ; T. W. King, P. C. Alexander, L. J. Reid, and R. B. Mackay ; F. R. K. Moffat and S. M. Mischler ; C. A. L. Richards, R. K. Lindsay, G. V. Shillito, W. E. Henley, T. L. Turner, E. W. Hall, H. M. Kelly, and A. G. Cridlan.

#### ARMY v. NAVY

The Army beat the Navy at Twickenham on Saturday, March 1, by 16 points to 10. The last match in the Inter-Services Tournament is Army v. R.A.F. at Twickenham on March 22. The probability is that the Army will again become champion service for the year, but in Rugby football probabilities are never certainties.

### Association Football

#### R.A.F. v. FULHAM

The R.A.F. Soccer XI played a most creditable pointless draw against a strong Fulham professional team on Thursday, February 27, at Craven Cottage. In fact, the R.A.F. had hard luck in not winning, for Sergt. Acquaroff put a shot into the net, but the ball touched L.A./C. Vernon, who was offside, and the score was disallowed. The two outstanding players on the Air Force side were Chaston in goal and Hickey, the outside left forward. Both played in really brilliant style, but the team as a whole was more than sound. The teams were :—

*Fulham*.—Mason ; J. B. Henderson, Avey ; Regan, Dudley, Lawson ; Craig, Steele, Frewin, Murphy, Proud.

*Royal Air Force*.—A/C. Chaston (Uxbridge) ; Corp. Pond (Henlow) ; L.A./C. James (Netheravon) ; Sergt. Trout (Hornchurch), Corp. Robinson (Henlow), A/C. Bulmer (Lee-on-Solent) ; Sergt. Turner (Upavon), A/C. Kelly (Henlow), L.A./C. Vernon (Halton), Sergt. Acquaroff (Worthydown), A/C. Hickey (Uxbridge).

### Hockey

#### R.A.F. v. ROYAL NAVY

The R.A.F. beat the Navy at Uxbridge on Wednesday, February 27, by 3 goals to 2. This makes the final result of the Inter-Services Hockey Tournament as follows :—

	Army	R.A.F.	Navy	Points
Army	..	Won	Drawn	+1
R.A.F.	..	Lost	Won	0
Navy	..	Drawn	—	-1

The Navy had the best of the game at first, and they scored the first goal, leading at half-time by 1—0. In the second half the R.A.F. became the dominant side, and played a fine open game. After 10 minutes Sales hit a goal and equalised. Five minutes later Maher scored again, and put the Air Force ahead. He had slipped and was on his knees when he lofted the ball into the net. Then the Navy came back, and Collett scored his second goal, and made the scores equal once again. Finally, Lascelles went away fast on the R.A.F. right wing and centred well. Bufton put the ball through with a ricochet off a Navy player. The teams were :—

*Royal Navy*.—Lieut.-Commander J. D. Campbell (R.N.), goal ; Surgeon Lieut.-Commander A. E. Phillips (R.N.) and Lieut. G. P. Morris (R.N.), backs ; Lieut. H. A. Traill (R.N.), Lieut. R. G. Swallow (R.N.), and Commander C. H. L. Woodhouse (R.N.), half-backs ; Paymaster Lieut. E. S. Satterthwaite (R.N.), Lieut. Collett (R.N.), Sub-Lieut. A. Kirkconnell (R.N.), Lieut. T. W. Atkinson (R.N.), and Lieut.-Commander R. C. Taylor (R.N.), forwards.

*Royal Air Force*.—Corporal C. Butler (Stanmore), goal ; Corporal Foreman (Sealand) and Flying Officer W. K. Beisiegel (Donibristle), backs ; Leading Aircraftman L. R. Hobbs (Uxbridge), Sgt. W. C. Maher (Upavon), and Leading Aircraftman Lodge (Worthydown), half-backs ; Flying Officer N. M. Jerram (Halton), Pilot Officer D. P. Lascelles (Tangmere), Flying Officer H. E. Sales (Bicester), Flying Officer S. C. Dufton (Bicester), and Flight-Lieut. H. N. Hampton (Digby), forwards.

#### CRANWELL v. WOOLWICH

The R.A.F. Cadet College was beaten at hockey by the Royal Military Academy on Wednesday, February 26, by 5 goals to 2. Woolwich got the first 2 goals, through Oswald, and then Baker scored for Cranwell. Oswald got a third goal for Woolwich before half-time. Later Hogan scored a very brilliant goal for Cranwell, but Woolwich put on two more goals before the whistle went. The teams were :—

*R.M.A.*.—C. F. C. Holder, goal ; The Maharajah of Jaipur and J. G. Geddes, backs ; W. A. R. Sumner, J. A. H. Mitchell, and G. R. T. Gillett, half-backs ; D. E. Holbrooke, G. C. Reeves (captain), M. St. J. Oswald, G. C. Grimshaw, and L. J. Harris, forwards.

*R.A.F. Cadet College*.—J. W. C. More (captain), goal ; C. W. Ling and N. C. Walker, backs ; R. H. A. Leigh, P. E. Drew, and C. E. J. Baines, half-backs ; H. A. V. Hogan, D. R. S. Baden, M. W. Baker, B. B. Coote, and D. B. D. Field, forwards.

## IN PARLIAMENT

**Dutch Aeroplane Service**

MR. BENN, on February 24, in reply to Lieut.-Comdr. Kenworthy, said the grant of facilities across India by the Government of India to a series of nine fortnightly flights by Dutch aircraft from Holland to Batavia and back, which commenced on September 12 last, was conditional on the outward flights being completed during 1929. Upon their completion in December last the Netherlands Minister asked that these facilities might be extended to a further series of nine or 10 trial flights up to June next. This request is at present under consideration by His Majesty's Government in consultation with the Government of India, and no decision has yet been reached in the matter.

**Indian Air Mail Service**

MR. BENN, in reply to Lieut.-Comdr. Kenworthy, said the Government of India hope to extend the London-Delhi air service to Calcutta next autumn and to Rangoon shortly afterwards. It may, however, be necessary temporarily to discontinue the service between Calcutta and Rangoon during the monsoon of 1931.

**Indian Air Mail**

MR. LEES-SMITH, on February 25, in reply to Mr. Wardlaw-Milne, said since the beginning of this year, the average weekly weight of air mail carried to India has been about 550 lbs., and the corresponding weight from India about 440 lbs. Apart from a very marked increase in both directions during the Christmas period, it cannot be said that there has recently been any definite tendency for the traffic to rise or fall.

**Air Services to India**

MR. MALONE, on February 26, asked the Under-Secretary of State for Air why, in the Imperial Airways London-to-India air route, it is necessary to proceed to Athens by rail; when it is expected that the air route to India will be available by air throughout.

MR. MONTAGUE: It having been found impossible up to the present to conclude with the Italian Government arrangements which were commercially satisfactory to Imperial Airways, Ltd., for the permanent operation of the air route to Athens via Genoa and Naples, the company have diverted the service for the present to a central European route. Until more experience has been gained of this new route, and in order to ensure as far as possible regularity in the arrival of mails, the company deemed it advisable during the winter months to send the mails by train between Cologne and Athens on the outward journey and between Athens and Paris on the return journey. The company hope to be in a position to carry out regular flights over this route in the spring.

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**Irvin Parachutes in Canada**

GEORGE WAITE, President of the Irving Air Chute Co., Inc., states that ground has been broken at Bridgeburg, Ont., Canada, for the construction of a Canadian plant for his company. It is expected that the plant will be in operation by early summer. This is the latest of many American plants which have been established within recent years on the Canadian side of the Niagara River, forming the development of the "International City" with Buffalo as the centre.

**Luxor Goggles in India—and Elsewhere**

AVIATORS, Service or Civil, in India, should have little difficulty in obtaining the well-known "Luxor" Goggles, for Meyrowitz and Co., of 1, Old Bond Street, inform us that their goggles are now obtainable throughout India at all the branches of Lawrence and Mayo. We understand that Flt./Lieut. Waghorn, Schneider Trophy winner, has presented the "Luxor" goggles he wore in the race to Kaye Don for the latter's attempt on the land speed record.

**Pratt's High Test Petrol**

WE are asked by the Proprietors of Pratt's High Test petrol, to correct an impression which appears to exist that this new petrol is sold at a higher price than ordinary motor spirits. Such is not the case. The new petrol, which is widely used in aircraft, is in fact, no dearer than ordinary petrols.



Above are Mr. Rimmer, Mr. Drew and Mr. Barrington-Mason who are flying for the Asiatic Petroleum Co. in our Dominions. They have each been supplied with a Williamson Pistol Aircraft Camera and the above photo was taken with one.

## PUBLICATIONS RECEIVED

*Aeronautical Research Committee Reports and Memoranda*: No. 1207 (Ae. 368).—Wing Flutter as Influenced by the Mobility of the Fuselage. By R. A. Frazer and W. J. Duncan. Sept., 1929. Price 1s. 3d. net. No. 1264 (M. 65). The Elasticity of Pintsch Crystals of Tungsten. By S. J. Wright, B.A. March, 1929. Price 9d. net. No. 1266 (E. 34).—Experiments on Flame Extinction in Gaseous Mixtures. By Sqdn.-Ldr. W. Helmore, M.Sc. January, 1929. Price 1s. net. H.M. Stationery Office, Kingsway, London, W.C.2.

*Elementary Laboratory Dynamics*. By Arthur L. Jordan. The Ronald Press Co., New York. London: Simpkin Marshall, Ltd., Stationers' Hall Court, E.C.4. Price 3s. 6d.

*The Airway to See Europe*. By Eleanor Elsnor. Albert E. Marriott, Ltd., 37-38, Golden Square, London, W.1. Price 6s. net.

*Aeronautical Research Committee Reports and Memoranda*: No. 1222 (M. 62).—High-Frequency Fatigue. By C. F. Jenkin and G. D. Lehmann. Dec., 1928. Price 1s. 6d. net. No. 1250.—Reports and Memoranda of the Aeronautical Research Committee Published between August 1, 1928, and August 31, 1929. Nov., 1929. Price 6d. net. H.M. Stationery Office, Kingsway, London, W.C.2.

*Twenty Thousand Miles in a Flying-Boat*. By Sir Alan Cobham. George C. Harrap and Co., Ltd., 39-41, Parker Street, W.C.2. Price 10s. 6d. net.

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## NEW COMPANIES REGISTERED

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## AERONAUTICAL PATENT SPECIFICATIONS

*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. (The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

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